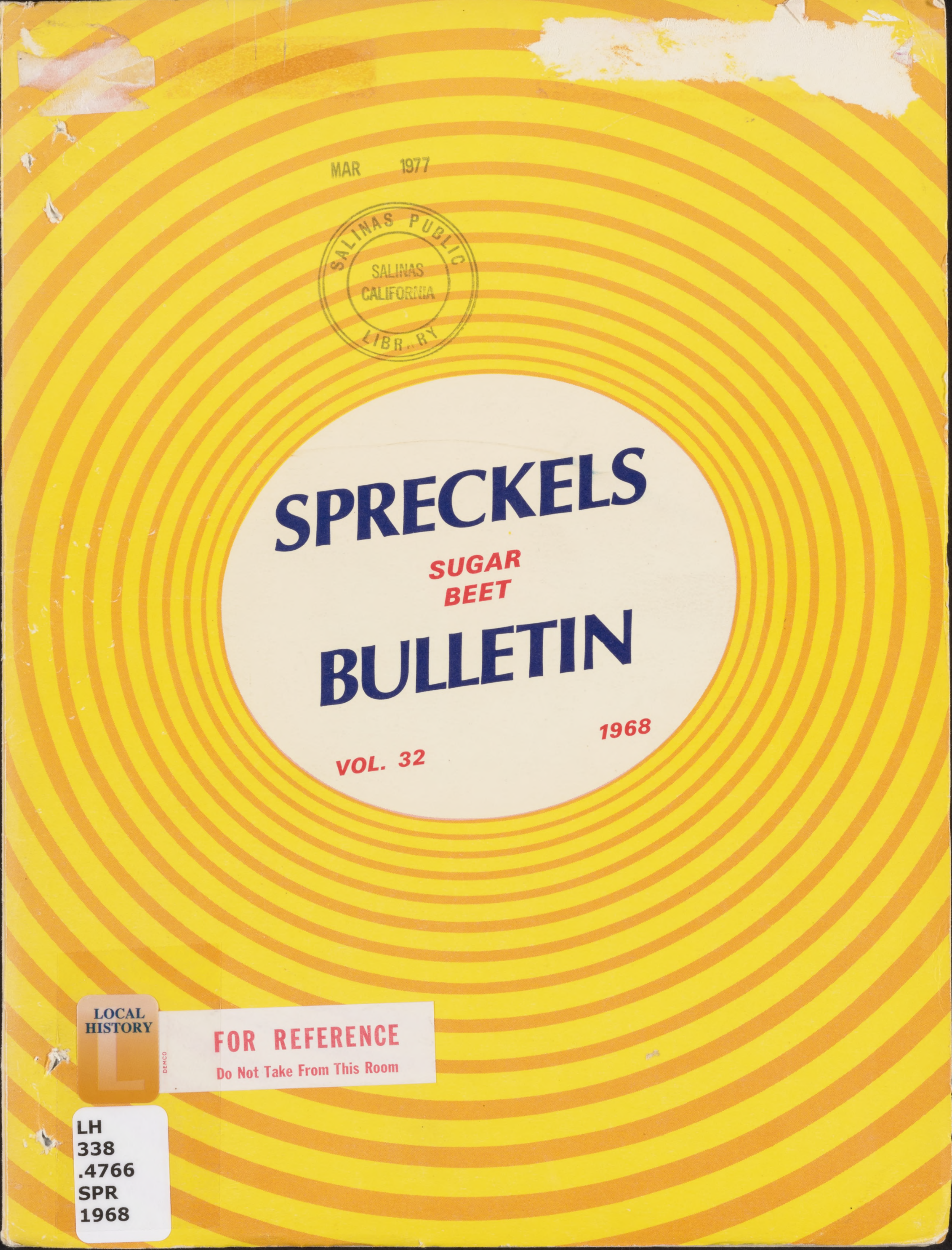

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SPRECKELS
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1968

VOL. 32

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SPRECKELS SUGAR BEET BULLETIN

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

VOL. 32 SPRING, 1968 NO. 1

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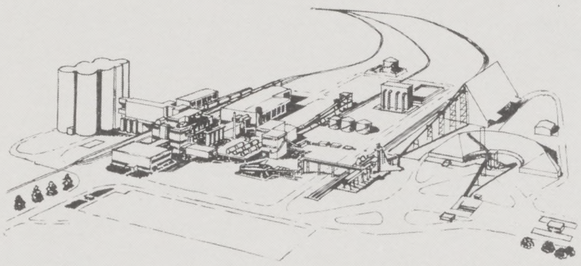
Curly Top Virus Control

SPRECKELS SUGAR BEET BULLETIN

VOL. 32 **SPRING, 1968** **NO. 1**



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Spreckels Sugar Beet Bulletin is published quarterly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. All photographs by the Editor unless otherwise specified. Please address all communications to: Spreckels Sugar Beet Bulletin, P.O. Box 325, Mendota, California 93640. Please include your zip code.

Cover Comment: This helicopter is spraying for the beet leafhopper which is the only known vector source of the curly top virus. The State of California conducts a massive spray program for this pest on the west side of the southern San Joaquin Valley. (See article on page 6).

EDITORIAL

The New Look

In May, 1937 Earl Coke, then General Agriculturist for Spreckels Sugar Company and now Director of the California Department of Agriculture, initiated The Sugar Beet Bulletin. In the first issue Mr. Coke stated the Bulletins purpose as follows: "To satisfy the demands of Spreckels sugar beet growers for timely information, we are inaugurating this series of monthly bulletins. While it may deal primarily with production problems such as beet machinery, seed, diseases, and irrigation methods, other phases of the industry will not be neglected. Sugar market information, the leafhopper situation and sugar legislation are other topics to be covered. If by this means of airing problems and of exchanging ideas and experiences, progress is made in solving some of the problems with which you deal, then this publication will be worthwhile. We hope you will like this bulletin."

Many changes in style, layout and frequency of publication have been made in the 31 years the Bulletin has been in existence but its main purpose is essentially the same as that stated by Mr. Coke in 1937.

Some of the recent changes include a new format, the use of a title page, a new section entitled Agricultural Staff Notes and an editorial column.

The Agricultural Staff Notes section will be devoted to reports made by members of Spreckels Sugar Companys' agricultural and research staffs on new and unusual cultural methods being used by growers throughout all beet growing areas.

The editorial column will generally cover the entire gamut of beet sugar production from the raising of the sugar beet crop to the marketing and consumption of sugar. Various staff members will at times contribute to this column and it is hoped that the material presented will be both interesting and thought provoking for the readership.

Since the Spreckels Sugar Beet Bulletin is published as a service to you as a grower, we will always welcome any comments, critical or otherwise, that you may have.

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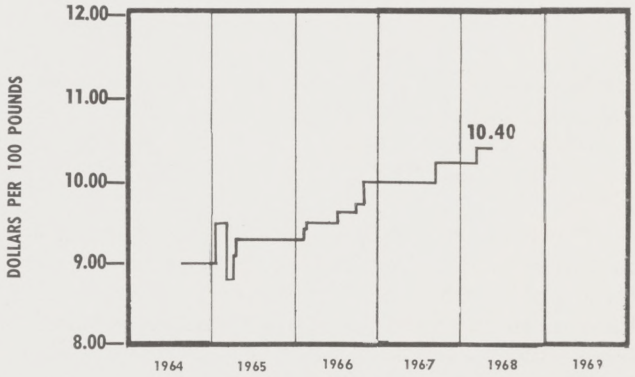
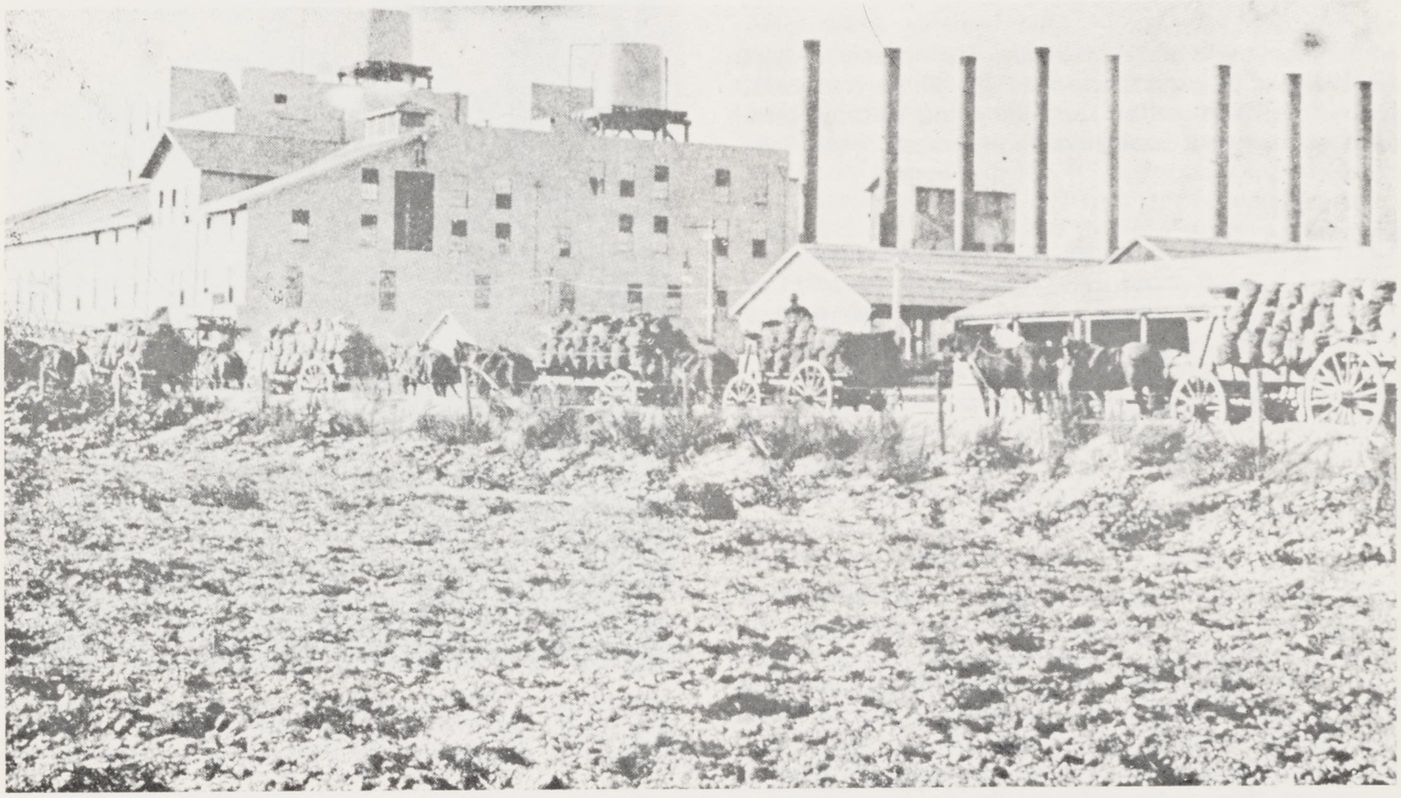
In 100 Lb. Paper Bags, F.O.B. Factory



The Father of America's Beet Sugar Factories



This is a partial view of Holly Sugar Corporation's factory at Alvarado, California. It was built in 1869 by E. H. Dyer, with his son E. F. Dyer and nephew H. P. Dyer. Alvarado was the only successful beet sugar factory in the United States until 1888 when Claus Spreckels built his factory at Watsonville, California, which in turn was followed by the Oxnard factory at Grand Island, Neb.

Nation's First Beet Sugar Factory To Be Phased Out

IN January of this year, John B. Bunker, President of the Holly Sugar Corporation, announced that Holly's Alvarado, California factory would be phased out and its functions absorbed by the Tracy and Hamilton City plants.

The historic factory was built near the east shore of San Francisco Bay in 1869 by E. H. and Ephraim Dyer and is America's first successful beet sugar factory. Prior to Alvarado, some 15 other factories had been tried across the United States with the first attempt made in the 1830's at Northampton, Massachusetts. All of these factories failed.

Alvarado's first year of production saw some 7,000 tons of beets sliced, boiled and relieved of their sugar. The original company went bankrupt four years later and the machinery was moved out. In 1879, the persistant Dyers along with a group of associates took over the buildings, installed different equipment and put the operation on a paying basis.

In 1886, with finances well under control, the plant was struck by a mechanical disaster. The boilers blew up and caused so much damage that the plant shut down for a full year.

Three years later, the Dyers sold the plant to the Alameda Sugar Company, which in turn sold out to Holly Sugar Corporation in 1927. After several renovations and enlargements over the years, Alvarado was completely rebuilt and modernized in 1936.

In 1962, the California Historical Society dedicated the site as a historical landmark.

In another year, the oldest successful sugar beet factory in the United States would have celebrated its Centennial anniversary. However, it was closed. . . . a victim of California's population explosion and urbanization.

Sugar Beet Stand Establishment

By George W. Wheatley

Mr. Wheatley is an Agronomist for Spreckels Sugar Company at Salinas, California. His primary responsibility is the production, processing and distribution of Spreckels Sugar Companys' commercial beet seed.

ONE of the pre-requisites for maximum sugar beet yields is a good stand. There are many variables associated with obtaining a good stand and some of these variables such as soil moisture, soil temperature, soil chemical conditions and seed placement can be controlled by the grower. Too often these factors are overlooked or neglected and a poor stand is the result. If the grower properly manipulates these factors on a timely basis there is no reason why a good stand of sugar beets cannot be obtained.

WHAT IS A GOOD STAND?

A good pre-thinning or newly emerged stand should have a high percent of single beets. Assuming a weed free condition, a minimal stand of sugar beets is one that could be left for a subsequent harvest. This same minimal stand, in the presence of weeds, however, could result in excessive costs for hand labor to remove the weeds and it may be more economical to replant, than to try and save the field.

Perhaps the most desirable post-thinning or harvest stand would be a single beet every 6 to 9 inches within the row, uniformly distributed throughout the field. Considerable research, by Spreckels Sugar Company Personnel and other Researchers, shows post-thinning or harvest stands can deviate considerably if the beets are rather uniformly distributed per 100 feet of row. An attempt should be made to have between 100 and 200 uniformly spaced beets per 100 feet of row.

A general rule, that is widely accepted, suggests that plant populations should be in the low ranges of those commonly recommended when short periods of growth are a potential and/or when the soil productivity potential is low—perhaps 100 to 120 beets per 100 feet of row. For long growing periods and/or production on soil of potential high productivity, plant populations in the higher ranges of those recommended should be maintained. Population of 160 to 200 beets per 100 feet of row may be desirable. It is more important that the beets are rather uniformly distributed than to have an exact number of plants per acre.

LAND PREPARATION AND BED CONSTRUCTION

Deep tillage is necessary to loosen the soil so the beet roots and moisture can penetrate the substrata. Sugar beet roots have been known to penetrate as much as 5 to 6 feet of soil.

Assuming that proper and adequate care has been given to field selection, land preparation practices for sugar beets should be geared to provide trash free, rather firm beds of proper height. Deep tillage is necessary to loosen the soil so the beet roots and moisture can penetrate the substrata. Deep tillage increases the potential productivity of the land because the beet roots have a larger area in which to feed.

Seed beds should not be over-worked. Too many fine soil particles in a seed bed frequently lead to a crust problem. However, enough fine soil particles should be present so they will adhere to the seed. Soil particles, even the size of a pea, if not intermixed with enough fine soil particles essentially provide a "wind tunnel type" seed bed. Under these conditions, the seed dries out rapidly after wetting and may frequently fail to germinate or, if it does germinate, the fragile seedling dies and disintegrates.

Bed height should be considered in relation to soil type. All beds regardless of height should be flat on the top and firm to facilitate proper planting procedure.

SOIL CHEMICAL CONDITIONS

Sugar beets are generally considered to be salt tolerant. However, excessive quantities of "salts" in the soil frequently reduce germination and seedling emergence. Lime or gypsum should be used to correct soil pH and/or improve the physical condition of the soil. Several anti-crusting materials have been evaluated in the past few years. Generally speaking,

If the grower properly manipulates soil moisture, soil chemical conditions and seed placement on a timely basis, there is no reason why a good stand of sugar beets cannot be obtained.

most of the materials tested have shown no advantages in reducing soil crusts or improving seedling emergence. In the Spreckels coastal beet growing areas, however, a five hundred (500) gallon per acre treatment of twenty percent (20%) active phosphoric acid (P_2O_5), sprayed in four inch bands over the seed row immediately after planting, has prevented soil crusting and improved seedling emergence under sprinkler irrigation.

SOIL MOISTURE

Three external conditions affect sugar beet seed germination: (1) water; (2) temperature; and (3) oxygen. The optimum germination temperature for beet seed is between 68 and 86 degrees Fahrenheit. Germination occurs below and above these temperatures, but it decreases and essentially stops below 40° F. and above 95° F.

Germination cannot occur unless the seed can absorb water from its environment. When soil moisture levels in the immediate vicinity of the seed are at field capacity, or slightly below, germination is usually most rapid. In the early stages of germination, seed can be saturated with water for short periods of time, but extended periods of excessive moisture will upset the oxygen-carbon dioxide balance of the soil and retard germination. This imbalance is often responsible for delaying weed seed germination for several years. Perhaps, we have experienced degrees of this in previous beet plantings, wherein the late emerging seedlings have prompted many to refer to them as "hard seed" or "hang fires".

Remember, improper moisture conditions, can nullify all of the other progressive practices associated with stand establishment. Excessive moisture can cause many soils to puddle or run together and restrict subsequent root development and nutrient uptake by plants. In addition, too much moisture may leach plant nutrients down below the seedling roots and restrict plant growth. It is important that moisture be available in the soil adjacent to the seed, the seedling, and plant roots; not just the furrows. Whether supplied by rain, furrow irrigation, or sprinkler irrigation, water can perform its necessary functions in germination and plant development, only when it is applied on a timely basis and in proper quantities.

The moisture requirements for germination and plant development are continuous. A feast or famine moisture supply restricts the potential stand and subsequent yield of beets. One to two additional irrigations are often required to maintain an adequate level of moisture around the seed for germination and emergence.

SEED PLACEMENT

Several planters are available that can be used to plant sugar beet seed with considerable precision. Theoretically, if you insist on 100 percent cell fill you must expect some multiples. On the other hand, if you attempt to have 100 percent single cell fill, you will have some empty cells and consequently some skips. It is very important to use the proper sized seed metering mechanisms. Seed cells that are too small will either grind the seed or fail to permit adequate cell fill. Seed cells that are too large, admit several seeds into each cell resulting in clumped seed distribution. Every planter should be checked at the beginning of each planting to determine the forward speed to travel to obtain the desired seed distribution.

Positive control of the depth at which the seeds are distributed is essential to assist in obtaining uniformity in seedling emergence. Depth bands should be used on all planters equipped with disc openers. These prevent placing the seed too deep, where the seed bed is soft. In heavy and medium textured soils, sugar beet seed should be planted between ½" and 1" deep. Be sure there are enough fine soil particles to surround the beet seeds to maintain a continuous moisture supply for rapid and complete germination. In sandy soils, it may be frequently desirable to plant the seeds approximately 1 inch deep to control the desired moisture level for germination and seedling emergence.

Planting should be done at a speed no faster than an easy walk. If you plant any faster you will lose all of the benefits of precision planting. Three and one-half miles per hour should be the maximum speed for precision planting. Slower speeds will give even

(Continued on page 12)

Curly Top Virus Control In California

By Donald R. Fehlman

Mr. Fehlman is an Economic Entomologist for the Bureau of Entomology, California State Department of Agriculture. He has been associated with the States' Leafhopper Control Program for the past six years.

CURLY TOP, a plant virus disease of major proportions has limited California crop growing areas since the turn of the century. The California Department of Agriculture accepted responsiiblity for rangeland control of the virus' only factor, the beet leafhopper, in 1943. The following factors influenced this decision.

1. A wide variety of crop plants is affected by the disease.
2. A curly top resistant sugar beet had been developed.
3. A reduction of sugar beet acreage and a corresponding increase in acreage of other curly top susceptible crops had occurred.
4. A wide variance in the degree of damage sustained by various crop plants exists. For example: Potatoes can stand considerable infection while peppers are easily killed by curly top.
5. Rangeland control requires spray applications on holdings of owners and lessee's which have no direct interest in the problem. The insect is migratory.

In 1950 growers of early tomatoes from Tulare County north through Stanislaus County suffered extreme curly top damage. As a direct result of this, $250,000 was made available from the Governor's emergency fund. Thus the first really large scale aerial control efforts were initiated on rangeland south of Merced County.

BEET LEAFHOPPER

The beet leafhopper *(Circulifer tenellus)* is the only vector of curly top disease in North America. Agricultural crop plants affected by this virus include sugar beets, radishes, cress, rhubarb, tomatoes, melons, squash, potatoes, cowpeas, clover, tobacco, peppers, spinach, flax, string and broad beans, pumpkins, cucumbers and some ornamental flowers.

To better understand this pest a brief life history is in order. The insect thrives in semi-arid localities where sunshine and sparse vegetation needed for its survival are abundant. The beet leafhopper always has one spring generation and can produce two. When winter annuals dry, the spring generation migrates from overwintering areas such as west side hills of the San Joaquin Valley. At this time some of these insects are carrying various strains of curly top virus. The beet leafhopper spends the summer on Russian thistle and other plants such as Bassia, pig weed, mustard and sugar beets, reproducing four to five times. In the fall female beet leafhoppers migrate back to rangeland overwintering areas where it is possible for each female to lay up to 300 eggs, thus producing the spring generation.

Most control work is accomplished by rangeland insecticidal spraying of beet leafhoppers during four critical periods of their life cycle. In October fixed wing aircraft are utilized to treat large acreages of beet leafhopper infested Russian thistle. If winter annuals have not emerged, smaller acreages of perennial brush are treated in November because concentrations of beet leafhoppers are found surviving on these interim host plants. In January the leafhoppers which have concentrated in winter reproductive areas are treated by helicopter before eggs are laid. Checking areas which supported winter leafhoppers, Beet Leafhopper Project personnel locate emerging spring nymphs which are sprayed in March or April before they migrate to croplands.

Some beet leafhoppers always find their way to susceptible crops and some areas sustain occasional moderate to severe curly top damage. These unfortunate outcroppings are minor compared to the precontrol yearly disease incidence averaging 27 percent.

Donald Fehlman is shown here taking samples of beet leafhoppers in the west side foothill area of the San Joaquin Valley.

The Bell helicopter shown here is contracted by the State of California for beet leafhopper spraying. It applies material in 100 foot swaths at an approximate speed of 60 m.p.h. Approximately 3,000 acres can be sprayed per day depending upon the type of terrain encountered. The ground support truck shown holds 2,500 gallons of material and pulls a trailer which holds 550 gallons.

Prior to 1951 epidemics occasionally wiped out the bulk of the San Joaquin Valley's sugar beet, tomato, melon, squash and pepper crops. Crops in the Sacramento and Salinas Valley were also severely affected.

1966 EPIDEMIC

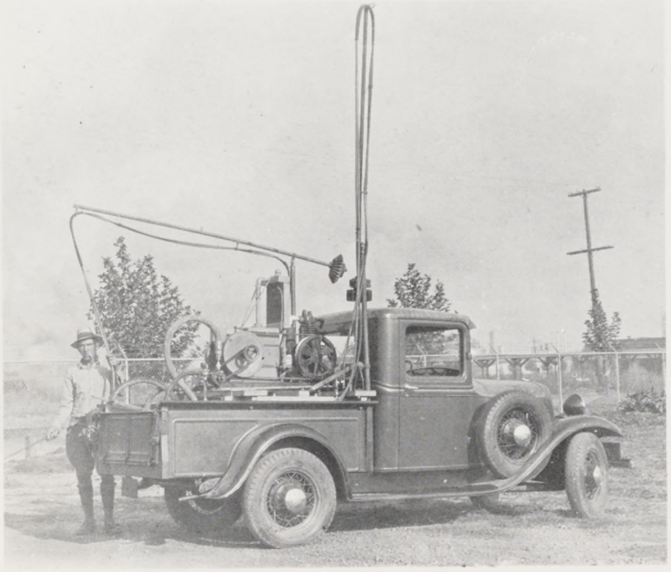
The last curly top epidemic of significance occurred in 1966. Severe curly top damage was suffered in a belt from Southern Merced County to Southern Kings County, extending approximately 15 miles from west side beet leafhopper overwintering grounds.

A relatively more potent strain of the virus was located in this area by the end of the 1966 growing season. We do not know if this virus strain contributed to initial damage or merely predominated by the end of the season because of favorable disease factors.

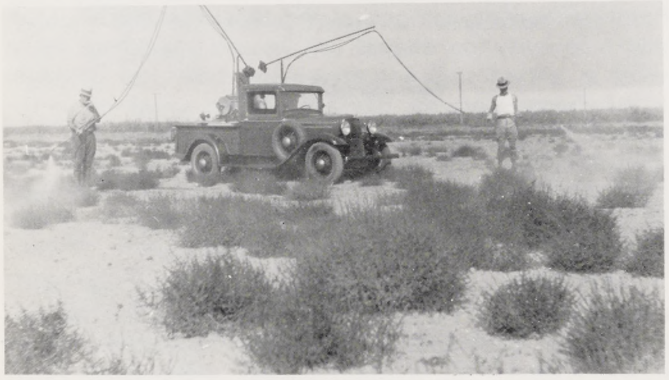
Tomatoes, although not a favored host plant of the beet leafhopper, are one of the most susceptible crop plants to curly top disease and in past years have been used as a yard stick for measuring curly top damage. It is believed periodic damage will be sustained as tomatoes are planted farther south and west in the San Joaquin Valley. As long as growers are aware of the curly top threat and beet leafhopper numbers are kept low, San Joaquin Valley tomato production will not be prohibited because of curly top disease.

The University of California, in conjunction with cooperating private firms has been investigating the production potentials of many new vegetable crops in the Western San Joaquin Valley. These crops must yield a high return per acre as they will be irrigated

These photographs show some of the equipment used for beet leafhopper control in the early 1930's. This picture was taken in Jacalitos Canyon south of Coalinga, California in 1932.



This 1933 spray rig was powered by a 3 h.p. Cushman engine. Contrast this equipment with that shown on the previous page.



Spraying for the beet leafhopper near Tracy, California in 1933.

with high cost California Aqueduct water. It has been demonstrated that curly top disease will be a determining factor in the successful production of squash, spinach, peppers, table beets and other vegetables.

Although additional curly top research should be undertaken, the state beet leafhopper control project enables farmers to successfully grow several curly top susceptible crop plants under otherwise prohibitive conditions.

The following information should assist you in more safely growing your crop:

1. The spring beet leafhopper flight usually occurs any time between mid-March and the last of April and consists of a series of flights as various winter habitats dry.
2. In the San Joaquin Valley north of Kern County a population of one beet leafhopper per row foot or ten sweeps can be deemed cause for immediate insecticidal treatment in sugar beets smaller than the six leaf stage but conditions vary so much specialists should often be consulted.
3. Once beet leafhoppers are discovered, immediate treatment prohibits egg laying in sugar beets and stops virus transmission to beets as yet unaffected.
4. If overwintered beet fields are dug in the vicinity of newly germinated sugar beets and if these beets are hosting beet leafhoppers from the spring flight, they should be treated prior to digging. Overwintered fields are commonly highly infected by this time and beet leafhoppers leaving them are much more viruliferous than those coming from rangeland.
5. Although treatment should be accomplished swiftly it is wise to be sure the leafhoppers in your fields are beet leafhoppers. Field identification of this insect is not difficult, but many people are not acquainted with the beet leafhopper.
6. The beet leafhopper is a sun loving insect that does not do well in a fast growing field of older beets. Any condition harmful to plant turgidity and vigor increases curly top damage; over fertilization, herbicide damage or lack of sufficient ground moisture can be dangerous.
7. During the past two years sugar company and University of California personnel have proven the effectiveness of several systemic insecticides. These can be of great value applied either as pre-plant or later topical treatment. Learn the benefits of these materials and the plant size limitations on their post emergence use.
8. If you grow tomatoes, remember they are not a beet leafhopper host plant but unlike sugar beets have no known resistance to curly top virus. Since beet leafhoppers will not stay in a tomato field your main threat is the spring flight. During the growing season be sure you do not destroy mustard, pig weeds or other plants if they are harboring beet leafhoppers adjacent to tomatoes, weed hosts can be treated to kill the beet leafhoppers prior to discing.

John Deere Introduces New Precision Planter

JOHN DEERE recently introduced its new #33 precision vegetable planter. The hopper, hopper bottom, and seed plate drive are the heart of this drill planting unit. Corrosion-resistant materials are used throughout. Moving parts are machined, and the tolerances between moving parts are held much closer than on any previous John Deere planters.

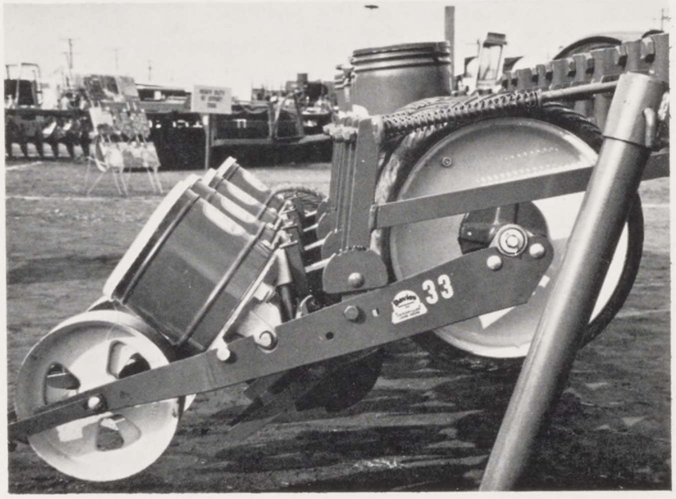
The 2½ quart capacity hopper is mounted in a slanting position with the brush cut-off and seed tube on the high side. A baffle plate holds seed above the seed plate. An opening on the low side of the baffle allows seeds to be picked up by the seed plate as needed. This means that the seed plate cells can pick up seeds one at a time. Gravity pulls excess seed away and the brush pushes individual seeds out of cells into the seed tube.

Seed spacing from .75 to 6.5 inches can be achieved depending upon the seed plate being used and the size of the sprockets. Plates which can handle seed up to 3/16 inch in diameter are available for a wide variety of vegetable crops including sugar beets.

The runner opener can be adjusted up and down on the frame to provide any planting depth from ⅛ inch to 1⅝ inches in 3/16 inch increments. Uniform planting depth is assured by spring loaded mounting brackets which provide uniform pressure between the front drive wheel and rear press wheel.

Each planting unit is held to its work by variable spring pressure which can be adjusted easily to meet varying soil conditions. The units clamp on any sled carrier, bedshaper, or tool bar having a 2 or 2¼ inch square bar. Gauge wheels should be used wtih tool bar outfits. A minimum of 12 inches in row spacing can be achieved with these units.

The sugar beet grower who already owns a John Deere Flexi-Planter can enjoy the advantages of these #33 precision vegetable hoppers at substantial savings. The vegetable hoppers, including adapting drive parts, are available as an attachment for your Flexi-Planter. This means that you can get greater planting accuracy with larger vegetable seeds than you have in the past.



This is John Deere's new #33 precision vegetable planter.

Milton Planter Has New Seed Wheel

HARBISON-PAINE, INC. recently announced some changes in their Milton Planter which should help to reduce wear and seed loss.

In the past the cells or pockets were machined in the seed wheels along the edges.

For small seeds, which are often no larger than 3/32″ in diameter, the cells were so small that the grooves machined in the rims for the seed ejectors left only a very thin wall around the edges. The resulting thin wall made the placement and adjustment of the seed ejectors very critical, and often time consuming. If this adjustment wasn't properly made excessive rubbing occurred which sometimes caused these rims to wear through completely.

Most types of seeds are relatively hard. With the cells machined in the sides of the wheel, the seeds would make contact with each side of the hopper. After countless turnings of the seed wheel, small grooves were worn in the steel plate and also in the aluminum casting of the main hopper. In time the grooves became so deep that the seeds could slip out of the cells and could be crushed between the seed wheel and the hopper.

To eliminate these problems the manufacturer now machines the seed cells into the center of the seed wheel surface and utilizes a new seed ejector. These changes eliminate (1) the wearing of the grooves in the sides of the hopper, (2) the wear caused by the seed ejector rubbing on the seed wheel and (3) eliminate the critical setting of the ejectors.

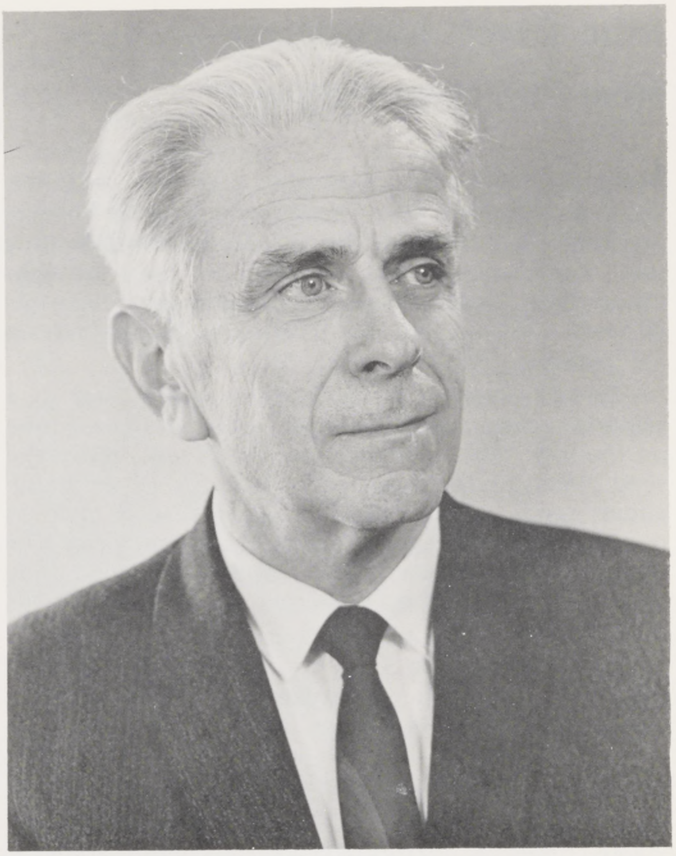
The new seed ejector consists of two arms with a spacer pin between them and two stainless steel blades which travel in narrow double grooves machined through each cell. The new ejector passes completely through each cell, lifting the seed rather than pushing it out of the cell and thus reduces seed damage.

More specific information on the new seed wheel and ejector can be obtained by writing to:

Harbison-Paine, Inc.
P.O. Box 448
Loveland, Colorado 80537

Meritorious Service Award

Dr. Albert Ulrich Honored by American Society of Sugar Beet Technologists



Dr. Albert Ulrich

DR. ALBERT ULRICH was recently honored by the American Society of Sugar Beet Technologists at its fifteenth biennial meeting held in Phoenix, Arizona. Dr. Ulrich was presented with a Meritorious Service Award for his outstanding and active service in promoting the objectives of the Society.

The A.S.S.B.T. is composed of representatives from beet sugar companies, universities, government research agencies, and others from the United States, Canada, and several European nations. Its members conduct research on all phases of beet sugar production from field production to factory processing.

Dr. Ulrich has been active in the Society's affairs since 1940. The index of A.S.S.B.T. publications lists him as an author or coauthor of some 22 papers. He was born in New York, New York on September 7, 1907. He received his Bachelor of Science Degree in 1930 and his Ph.D in 1939, both from the University of California. He has been associated with the University of California throughout his professional career. During 1949-1953 he was a research fellow at the California Institute of Technology at the Earhart Plant Research Laboratory. He is a member of and was elected a fellow of the American Society of Agronomy in 1964.

He is one of the countries leading authorities on the principles and practices of plant analysis in crop production. He served for three years as chairman of the National Research Council Committee on Plant Composition and for more than fifteen years has been a lecturer on field plot and tissue testing techniques as aids in the systematic planning of fertilizer programs at the University of California. He also has lectured in New Zealand, Brazil, Argentina, and Belgium.

The beet sugar industry is especially indebted to Dr. Ulrich for his extensive work on sugar beet nutrition. His work on nitrogen has specifically been of great value.

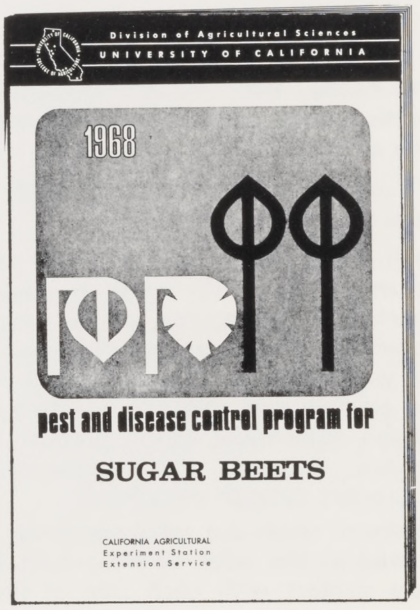
Pest and Disease Control Booklet

THE 1968 version of "Pest and Disease Control Program for Sugar Beets" is now available. This pamphlet is published by the Agricultural Extension Service at the University of California and lists the principal fungus and insect pests of sugar beets. Chemical control recommendations are also listed along with application rates and methods.

It should be noted that the recommendations for seed treatment to control damping off and wireworms are those used by Spreckels Sugar Company. Hence it is not necessary to treat any seed issued by the Company.

The pamphlet can be obtained at your local Farm Advisers Office or by writing to:

Agricultural Publications
207 University Hall
University of California
Berkeley, California 94720



Division of Agricultural Sciences
UNIVERSITY OF CALIFORNIA

1968

pest and disease control program for
SUGAR BEETS

CALIFORNIA AGRICULTURAL
Experiment Station
Extension Service

AGRICULTURAL STAFF NOTES

Gene Wilkinson

Field Superintendent, Woodland

WHEN a shoe opener is used on a John Deere flexi-planter it looses its flex. Instead of having the opener's depth regulated partially by the depth bands the planter is locked and the depth is entirely regulated by the drive wheel at the rear. This has one disadvantage; if the shoe rides up on a hard spot or anything else, the drive wheel is raised off the ground and your planter ceases to drop seed or plant. This can be overcome very simply. There is a metal strap which is employed to lock the planter. The strap must be slotted and a spacer used so it can move freely. The planter is then held solid at the maximum depth, (depth band depth), and when it rides upon anything, the spring tension keeps the drive wheel in contact with the ground.

This adaptation may be of more value to those planting milo, etc., where more depth is desirable than with sugar beets.

Richard Heimforth

Field Superintendent, Mendota

DON SCHRAMM, a grower in the Helm and Tranquillity areas, wanted a pre-emergence postplant herbicide to give him good weed control from planting through thinning (stage when Treflan is applied).

Last year he treated 5 acres of 30" beds with a mixture of 5 lbs. of 80% Pyramin and 8 lbs. of TCA.

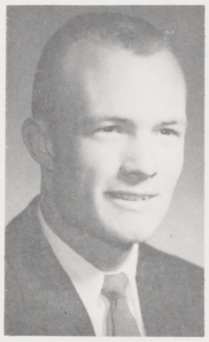
A ground rig was used to apply 20 gallons of material per sprayed acre in a 6 inch band. The material cost approximately $7.00 per acre. It rained immediately after the application and when beets and weeds emerged the 6 inch band was free of weeds.

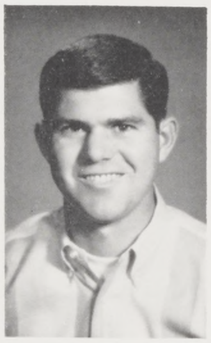
Don repeated the same application this year on 35 acres. The results again looked very encouraging.

The combination of Pyramin and TCA appears to give a broad spectrum of weed control. Weeds controlled were volunteer barley, wild oats, cocklebur, wild lettuce, black mustard, fiddleneck, London rocket, lambsquarter, and watergrass.

Some stand reduction and temporary stunting were noted both years but didn't appear to be a problem. Adequate moisture is very critical. One half to one inch of moisture via rain or sprinkler irrigation is necessary for best results.

Don's experiments appear to have given some insight for a possible herbicide combination for pre-emergence postplant use. Further testing must be run to determine its full merits. Don plans to continue working with the combination next year, only wishing that he had treated more of his sugar beet acreage this year.


G. Wilkinson


R. Heimforth

M. Ball

Morris Ball

Field Superintendent, Bakersfield

THE Pyramin plus Dowpon combination is being used quite extensively throughout the Arvin-Conner districts this year. It has been extremely successful as a post emergence herbicide where conditions have warranted its use and where it has been used properly. Good weed control has been achieved with the recommended combination of materials in many fields where weed growth was beyond the suggested range of control. The problem being encountered with the materials, however, is not in controlling weeds, but more realistically, with beet damage itself.

The optimal size for treating in the Kern County area is when the beets are in the four to six true leaf stage of growth. Damage has been sustained on beets sprayed in the cotyledon stage, especially on sandy soils.

It is realized that delaying the application of the Pyramin-Dowpon combination, either to allow the beets to reach a more favorable size or to adjust to temperatures, will undoubtedly create a more severe weed problem. With this in mind, several fields with heavy weed problems were treated on the small size in an attempt to obtain maximum weed control. The end result was a reduction in the beet stands. However, it did appear in most cases that the excellent weed control obtained would offset the stand losses.

Caution should be used when treating fields at temperatures of 80° and higher or when sudden increases in temperature are expected. Treating only those beets that have reached the four to six leaf stage will help minimize damage resulting from adverse temperature situations and will also shorten the recovery period. Delaying the application of the herbicide for a few days to give the plants time to adjust to rises in temperature may also help to minimize damage.

The condition of the sugar beet plant at the time of application is another factor overlooked by many.

(Continued on bottom of page 12)

Agricultural Staff Changes

Carlton Schaffer Transferred to Bakersfield

Carlton Schaffer, formerly Field Superintendent for the Del Paso and Tudor areas of District III, Woodland, has been transferred to Bakersfield, California. He will serve as Field Supt. for the Lerdo area.

He joined Spreckels Sugar Company at Woodland in November, 1965 as an Assistant Field Superintendent. He was subsequently promoted to Field Superintendent for the Del Paso and Tudor areas in the spring of 1966.

A native of Orland, California, Mr. Schaffer attended Chico State College where he majored in Agricultural Mechanics. He spent two years in the U.S. Army and served part of his time in the Pentagon.

Mr. Schaffer and his wife Arlene will reside in Bakersfield, California.

Ronald Jones Transferred to Woodland

Ronald Jones, formerly Assistant Field Superintendent in District IV, Mendota, has been promoted to the position of Field Superintendent and assigned to District III, Woodland. He will replace Carlton Schaffer in the Del Paso and Tudor areas.

Mr. Jones began his employment at Mendota in June, 1967 and worked with the District IV agricultural research and field staffs until the present.

He is a native of Bakersfield, California and attended the California State Polytechnic College at San Luis Obispo where he received a degree in Agricultural Business Management.

R. Jones

C. Schaffer

F. Hunt

Mr. Jones, his wife Kathleen and two children now reside in Woodland, California.

Frank Hunt Joins District IV Staff

Frank Hunt recently joined Spreckels Sugar Company's Agricultural Staff as an Assistant Field Superintendent. He has been assigned to District IV, Mendota where he will work with the agricultural research and field staffs.

Mr. Hunt is a native of Glendale, Arizona and attended the University of Arizona where he majored in Horticulture and received a degree in Agricultural Science.

He served three years in the U.S. Navy as a naval gunfire officer and participated in some 19 amphibious assaults against the enemy during a two year tour of duty in Vietnam.

Mr. Hunt, his wife Mary and son Robert will reside in Fresno, California.

SUGAR BEET STAND ESTABLISHMENT

(Continued from page 5)

better results. Planting at a speed in excess of three and one-half miles per hour will scatter the seed and distribute it unevenly in terms of depth and lateral distribution. The importance of proper and precise seed placement cannot be overemphasized.

Planter depressions caused by packer wheels frequently cause trouble. Rain and sprinkler water often puddle in these depressions resulting in serious soil crusting. Even though crusting may not be a problem, planter depressions interfere with proper cultivation and can cause problems when using mechanical thinning and blocking equipment.

Editor's Note: *Maybe it is time for the grower who rather consistently has stand difficulties to re-evaluate his planting and cultural practices. Too often the considerations just mentioned are overlooked and the beet seed is blamed for the poor stands. For instance, the seed that produced the very good stands in Northern California beet growing areas in 1966 is the same seed that was planted in 1967 when stands were difficult to achieve. The conditions changed, the seed didn't. Cultural operations have to be varied with climatic conditions. One irrigation may yield a stand one year and it may take as many as three irrigations to get a stand the following year. Consultation with your Field Superintendent to review present and new advances in sugar beet culture as outlined herein, can go a long way in improving the sugar beet producers profit margin.*

AGRICULTURAL STAFF NOTES

(Continued from page 11)

Beets stressed for moisture are being stunted more severely than those with adequate moisture and the recovery time of the stressed plants is longer.

Rolling the field just prior to or immediately following the herbicide application, in some cases, has caused severe damage and loss of stand. Therefore, this should be avoided if at all possible.

Recent research has indicated that possibly some surfactants being used as wetting agents are actually herbicides in themselves. Until further information is gathered, it might be a good idea to use only X-77 or Tronic as the wetting agent.

SALINAS PUBLIC LIBRARY

SPRECKELS SUGAR BEET BULLETIN

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

OC 9 '68

Summer, 1968

General News and Comment

Imperial Valley - Spreckels Sugar Company has contracted some 7,000 acres of 1968 crop year sugar beets in the Imperial Valley. This acreage will be harvested during a period extending from mid May to July 1. Outside receiving stations will be constructed shortly to provide shipping capacity to the Mendota factory where the beets will be processed. This program will afford those growers involved an opportunity to harvest their beets during a prime harvest period and will also enable Spreckels Sugar Company to extend the operations of its Mendota factory. The Imperial Valley operations will be under the direction of J. Byron Larsen, Agricultural District Manager, Salinas. William Hodson, formerly Field Superintendent in the Visalia area has been appointed Agricultural Superintendent for the Imperial Valley and will serve as Spreckels Sugar Companys' full time representative there.

Arizona - Harvest of central Arizona's 1967 sugar beet crop was recently completed. An excellent average yield of 22 plus tons per acre and 15 percent sugar was obtained on some 12,000 acres. This is approximately 5½ tons more per acre than 1966's average. This year's acreage (1968) in the Central Arizona counties of Pinal and Maricopa is considerably higher than last years and will be in the neighborhood of 20,000 acres. In addition 6,000 acres have been planted in Graham and Cochise counties and the Lordsburg, New Mexico area for harvest in the fall of 1968.

General Farm Bill - H. R. 17126 passed the House on Wednesday, July 31, by a vote of 213 to 176 with 43 not voting. The bill extended the general farm program for one year (through 1970) and placed a limitation of $20,000 on farm payments to any producer. The limitation does not, however, apply to Sugar Act payments or to price support loans. The Sugar Act, incidentally, is a separate piece of legislation and is not up for renewal until 1971.

The Senate also has a farm bill but it would extend the program for four years and place no limitation upon payments.

Some Washington observers speculate that when the House and Senate compromise the differences in their bills, the final bill will not include any limitations on payments and will extend the farm programs for only 1 to 2 years.

Proportionate Shares - There is a chance that acreage restrictions will be imposed on 1969 crop year plantings. Nationwide, 1968 planted acreage is up over the previous four years. The U.S.D.A. Crop Reporting Board's July estimate of 1968 acreage is 1,510,000 acres. Those in the industry who are opposed to restrictions feel it is doubtful the industry can produce enough sugar to meet its marketing requirements in 1970 and maintain adequate inventory levels.

The U.S.D.A. is expected to make its final determinations sometime this month.

SPRECKELS SUGAR BEET BULLETIN

VOL. 32 SUMMER, 1968 NO. 2

Gerald Nordstrom .... *Editor*

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J. M. Kendrick .... *Agr. Manager*

District Managers

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Stewart Anderson .... *District II, Manteca*
Don Hefner .... *District III, Woodland*
Dan Dieter .... *District IV, Mendota*
Ralph Lambdin .... *District V, Arizona*

Spreckels Sugar Beet Bulletin is published quarterly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. All photographs by the Editor unless otherwise specified. Please address all communications to: Spreckels Sugar Beet Bulletin, P.O. Box 325, Mendota, California 93640. Please include your zip code.

Cover Comment: Spreckels Sugar Company's Salinas Factory has never missed a year's production since it was built 70 years ago in 1898. It is one of the oldest factories in the United States and is the largest in terms of slicing capacity, some 7,200 tons of sugar beets daily.

The Use of Insecticides For Curly Top Virus Control

By Lauren Burtch

Mr. Burtch is the Chief Agronomist for Spreckels Sugar Company in California and Arizona. He directs Company research efforts from Factory 4, Mendota.

Curly top virus disease was the principal limiting factor for sugar beet production west of the Rockies from the early 1900's until after World War II. By the late 1920's, many western sugar beet factories had been abandoned and moved after curly top epidemics. In 1929, Congress appropriated funds for investigations of curly top and its only known vector the beet leafhopper. All aspects of the problem were thoroughly researched and an effective control program was eventually developed. This program in California consisted of two main approaches, (1) the development of resistant sugar beet varieties and (2) a large scale host and leaf hopper control effort in the principal problem areas. The latter program was well covered in the Spring, 1968 issue of the Bulletin in an article written by D. R. Fehlman, Economic Entomologist for the California Bureau of Entomology.

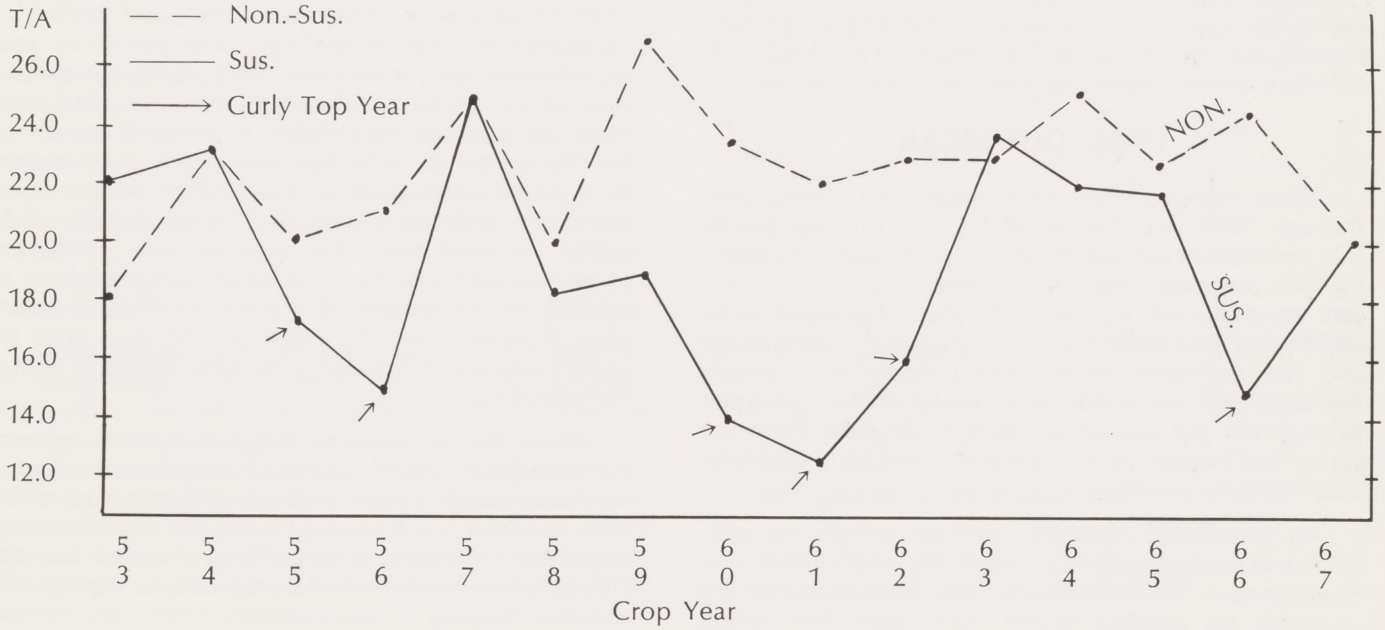
These control measures have worked quite satisfactorily for most years, but curly top has continued to cause economic losses along the west side of the San Joaquin Valley in epidemic years.

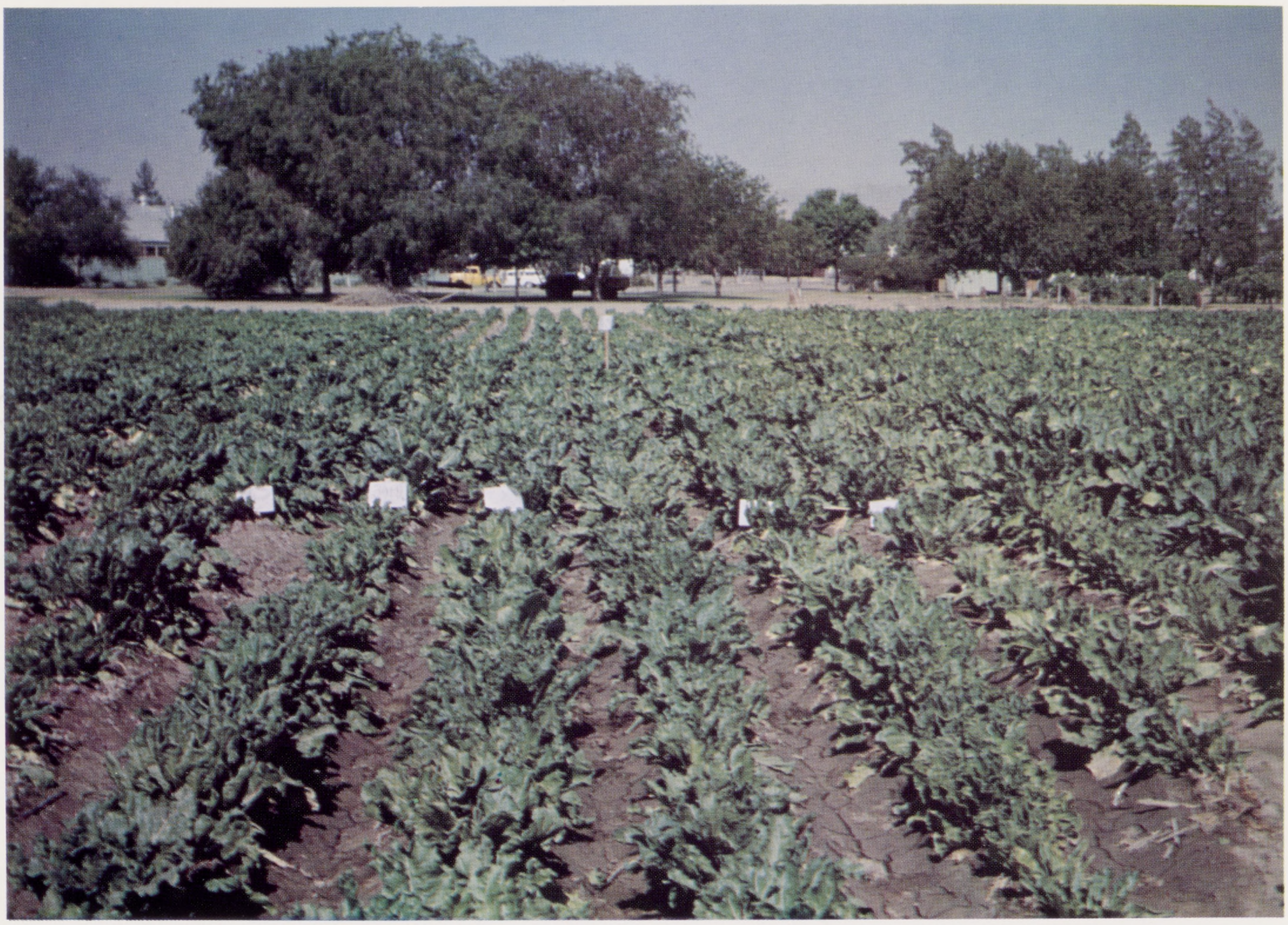
The chart in figure 1 compares yields obtained from two San Joaquin Valley beet receiving stations between 1953 and 1967. One station is located in a major beet growing area where curly top has never been a problem. The other station is located near the center of the major curly top susceptible area. It can easily be seen that in non-epidemic years, yields from the two stations are quite comparable but when curly top is a factor, serious yield reductions occurred in the susceptible area. A close look at the chart shows that while yield reductions have occurred six times in 15 years there has been no regular trend to the loss years.

In March of 1961 the Spreckels Sugar Company research staff at Mendota established a series of preplant systemic insecticide experiments near Five Points. These experiments consisted of comparing the influence of a preplant application of thimet on the curly top percentage found in a number of sugar beet varieties having varying degrees of resistance to the disease.

The first of these studies was planted in March of 1961 and resulted in excellent control in each variety with only an average of 2% curly top showing 60 days after treatment compared with 36% in the untreated plots. The range in curly top in the untreated

FIGURE 1—A COMPARISON OF SEASONAL YIELDS FROM A CURLY TOP SUSCEPTIBLE AREA WITH YIELDS FROM A NON-SUSCEPTIBLE AREA—1953 - 1967





The depressed area in the foreground consists of a wide range of varieties which did not have any chemical treatment. The same varieties in the background have been protected by pre-plant Thimet. Without Thimet, yields of resistant varieties were halved.

plots ranged from 26% for the most resistant variety to 50% for the least resistant.

Under varying leaf hopper populations, the experiment was repeated in a date of planting study conducted during the fall and winter of 1961-1962 with effective control resulting from preplant treatment.

1966 OUTBREAK

These experiments were continued from 1962 through 1965, but the incidence of curly top during this period was too low to obtain meaningful readings. In 1966, however, the most serious outbreak of curly top encountered in over 15 years occurred. The severity of this outbreak was completely unexpected and the economic losses associated with it clearly demonstrated the value of an insect control program to augment the regular protection obtained from the States' leaf hopper control program, and early plantings with resistant varieties.

An intensified research program comparing preplant and topical systemic insecticide applications was established in 1967. Although early conditions seemed favorable for another severe injury year, late spring rains delayed the movement of the leaf hoppers from the breeding ground to commercial beet fields and curly top losses were light. Nevertheless, considerable research data were obtained in 1967, and 1968 which supported the earlier findings. The results of seven experiments conducted since 1961 planted at different seasons and under a wide variation of curly top conditions are summarized in table 1. In each experiment, the incidence of curly top was significantly reduced by a single application of 1 pound of thimet (active) per acre placed approximately 5 inches directly underneath the seed row. The average ratio of diseased plants was reduced by a factor of 3 regardless of the severity of the disease. For example in 1968, treated plots showed only 29% infection 100 days after preplant treatment compared with 88% infection without the protection.

All of the comparisons listed in table 1 represent the averages of many varieties having broad ranges of resistance to curly top. In all cases, thimet applications have reduced the curly top incidence for all varieties tested from the most susceptible to the most resistant. This influence is illustrated by the data in table 2. Five varieties ranging in susceptibility from very resistant

One method of applying pre-plant Thimet is shown above.

to susceptible were compared with and without preplant thimet. The test was planted in early June with leaf hoppers present and with an adjacent source of infected plants. Two detailed counts were made; one in July just after thinning (45 days after application) and the final count in October approximately 15 days before harvest. The treated varieties ranged between 0 and 1.6% injury in July compared with 6% to 18% for the untreated varieties. By October the range in the treated varieties had increased from 5% to 35%, while the untreated varieties ranged from 9 to 84%. The experiment was harvested in early November with the treated varieties averaging 28 tons per acre with individual varieties ranging from 24.9 to 29.9 tons. The untreated varieties averaged 24.5 tons with a range from 18.0 tons to 32.7 tons per acre.

VARIETY COMPARISONS

Several individual comparisons are of interest. First, under the mild curly top conditions present, the more resistant varieties yielded very well without the insecticide application, but the varieties with lesser resistance (201H and 501H) had yields substantially reduced without the insecticide protection. With protection, these varieties had yield improvements of 9.7 tons and 6.9 tons, respectively. Further, the thimet protection, enabled the least resistant variety (501H), to perform as well as the standard resistant commercial variety 301H in both yield and curly top incidence.

Many growers have inquired about the possibility of substituting topical applications for the preplant application. In 1967, an experiment was conducted west of Mendota comparing preplant and topical applications of thimet with two topical applications of meta-systox R (table 3). The results of the experiment verified that a preplant application even on early planted beets is preferred to a more costly postemergence application of thimet or meta-systox R.

TABLE 1: A SUMMARY OF SEVEN TRIALS SHOWING INFLUENCE OF A PREPLANT APPLICATION OF PHORATE ON INCIDENCE OF CURLY TOP

PL.	COUNT	PHORATE	PLANTS	CT.	%
3/61	May	1 LB.	3305	69	2.1
		0	3082	1118	36.3
9/61	Nov.	1 LB.	10759	211	2.0
		0	9630	629	6.5
5/62	June	1 LB.	13554	1655	12.2
		0	13617	4547	33.4
2/67	June	1 LB.	3728	196	5.3
		0	4009	521	13.1
3/67	July	1 LB.	31033	398	1.3
		0	31215	1404	4.5
6/67	Oct.	1 LB.	2327	347	14.9
		0	2366	899	38.0
3/68	July	1 LB.	2322	676	29.1
		0	2109	1859	88.1
MEAN		1 LB.	64706	2876	4.4
		0	63919	9118	14.3

TABLE 2: THE EFFECT OF A PREPLANT APPLICATION OF PHORATE ON YIELD AND CURLY TOP INCIDENCE IN 5 SUGAR BEET VARIETIES, MENDOTA, CALIFORNIA 1967

	PHORATE/1 LB./AC.			NO TREATMENT		
	T/A	% CT 7/21	% CT 10/9	T/A	% CT 7/21	% CT 10/9
USH9B	29.9	1.4	5.1	32.7	6.9	13.8
64290	29.9	0	6.8	27.5	6.2	9.1
301H	26.6	1.0	8.0	25.3	8.5	32.1
201H	28.9	1.0	27.0	19.2	7.3	67.1
501H	24.9	1.6	35.3	18.0	18.1	83.6
Mean	28.0	1.0	16.4	24.5	9.4	41.1
LSD P = .05				4.3	7.3	10.5

TABLE 3: THE INFLUENCE OF PRE AND POST PLANTING APPLICATIONS OF SYSTEMIC INSECTICIDES ON THE YIELD AND PERCENTAGE OF CURLY TOP IN SUGAR BEETS, MENDOTA, CALIFORNIA, 1967

TREATMENT PREPLANT	POST PLANT		VIGOR RATING	YIELD T/A	% C.T.
Thimet[1]	MS-R[2]	Thimet[1]	1.3	30.8	4.1
Thimet			2.0	29.9	5.3
	MS-R		1.8	29.8	7.1
		Thimet	2.7	26.8	10.1
No Treatment			2.8	26.9	13.0
	General Mean		2.1	28.7	7.5
	LSD .05		1.0	3.4	3.0
	LSD .01				4.1

[1] Thimet 1 lb.

[2] Two applications Meta-Systox-R 1 lb.

(Continued on page 24)

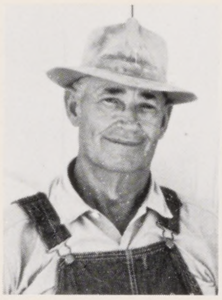
The 1967

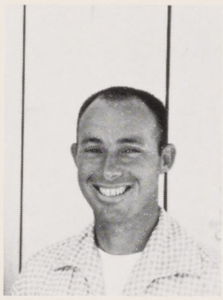
We proudly publish the names of those growers whose 1967 crop sugar beets exceeded 25 tons per acre. The names are listed in descending order of "Pounds of Sugar Per Acre."

Districts I & IV had average or better years in terms of production but Districts II & III experienced a poor crop as the result of a combination of environmental

Ernie Skaggs - D. IV
Santa Rita Ranch Co.

Albert Fonseca - D. II


D. T. Locke - D. IV


Danny Locke - D. IV

Jim Tanaka - D. II

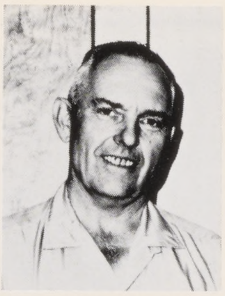
DISTRICT I — SALINAS

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Owen T. Rice & Sons, Inc.	99	34.96	12,229
William Whitney	25	42.60	12,184
Hansen & Fowler	44	38.91	11,206
W. M. Sullivan	23	32.33	11,012
Herold Ranches	36	38.63	10,708
Steve Pervetich	10	35.34	10,531
Growers Produce Dispatch	30	37.30	10,519
Harless Bros.	23	29.11	10,462
Herold Ranches	17	32.75	10,362
Growers Produce Dispatch	14	37.72	10,358
Owen T. Rice & Sons, Inc.	125	30.30	10,005
Wm. D. Crinklaw	120	31.71	9,963
A. Bassetti & Sons	20	39.36	9,958
Chas. Morgantini & Sons	10	41.50	9,894
Frank Taylor	80	34.85	9,842
Harless Bros.	17	29.66	9,758
California Coastal Farms, Inc.	25	30.80	9,727
Wm. D. Crinklaw	28	40.12	9,717
Latasa Bros.	85	32.80	9,604
John Pryor	35	31.75	9,544
Herold Ranches	18	33.32	9,470
John O. Andersen	83	30.39	9,384
California Coastal Farms, Inc.	20	31.87	9,357
Frank Taylor	29	34.70	9,335
Herold Ranches	31	31.56	9,348
Merrill Farms	26	28.36	9,285
Schween Bros.	29	29.92	9,209
Consolidated Growers, Inc.	70	30.41	9,196
Tony F. Silveira, Jr.	19	33.44	9,169
Al Andersen	66	27.91	9,132
H. & E. Christensen	17	30.00	9,120
Gill Bros.	35	35.93	9,112
E. E. & M. F. Nutting	16	33.55	9,112
Schween Bros.	55	31.42	9,087
Bruce Sconberg	36	31.92	9,033
E. J. Foletta & Son	14	33.63	9,020
Schween Bros.	38	29.45	9,018
Robert A. Smith	18	35.05	8,973
James H. Watson	26	31.71	8,955
Richard Morgantini	65	27.62	8,932
Henry Signorotti	10	33.59	8,908
The Garin Co.	77	30.74	8,908
Wm. D. Crinklaw	200	28.97	8,888
B. E. Johnson	41	29.49	8,847
Mortensen Bros.	46	28.22	8,839
Linc & Ben Handley	50	32.16	8,793
Latasa Bros.	66	28.21	8,779
Bennie Yamane	36	30.98	8,774
Merit Packing Co.	59	30.18	8,764
C. L. & A. W. Johnson	36	28.56	8,762
J. M. Thorne	25	32.85	8,718
E. E. & M. F. Nutting	15	31.94	8,637
A. L. Clement & Sons	100	28.15	8,636
A. F. Silveira & Sons	33	30.43	8,618
Franscioni & Griva Corp.	25	31.44	8,602
J. E. Blair	12	34.14	8,549
John Oreggia & Co.	41	29.14	8,491
Anselmo Pura & Son	15	29.49	8,316
Valley Pkg. Co. Alfred Bassetti	28	27.78	8,312
J. P. Jarvis	26	29.36	8,297
Herold Ranches	44	31.40	8,239
Tom Hambey & Son	27	29.54	8,230
Jack A. Hayes	594	28.47	8,199
Roy Fultz	55	28.97	8,175
Silveira Bros.	50	28.85	8,153
Peter A. Stolich Co. Inc.	27	29.48	8,136
Robert A. Smith	16	33.54	8,123
Wiley Farms Inc.	47	29.67	8,118
Botelho Bros.	15	28.53	8,114
Obata Bros.	42	28.00	8,114
Rianda Bros.	43	25.84	8,088
Salaberry & Guidici	39	26.39	8,054
Elmer Johnsen	69	30.50	8,046
E. John Nielsen Co.	30	28.21	7,995
Herold Ranches	29	30.98	8,011
E. John Nielsen Co.	30	28.21	7,995
Raymond Martin	40	30.11	7,979
F. J. Martin	42	31.36	7,978
Robert J. Thorp	18	27.04	7,966
W. W. Johnson & Son	103	28.57	7,960
Tognetti Bros	27	27.85	7,948
Casillas Bros.	25	29.29	7,932
Major Farms, Inc.	79	27.68	7,861
San Vicente Ranch	90	27.33	7,849
Arthur F. Bromquist	51	26.91	7,842
Robert A. Smith	13	31.59	7,771
Herold Ranches	121	25.80	7,755
Linc & Ben Handley	107	29.03	7,705
Tom Da Rosa	76	26.99	7,671
Sgheiza Bros.	21	25.40	7,645
Leo & Robert Meyer	30	26.54	7,644
Bruce Church, Inc.	65	25.80	7,580
L. & J. Farms	17	25.71	7,507
Rincon Farms	13	25.02	7,441
Raymond Martin	70	26.90	7,424
Botelho Bros.	11	28.16	7,417
Raymond Martin	38	25.53	7,409
Jim Fanoe & Son	28	25.98	7,363
James H. Watson	7	26.60	7,347
S. Braga & Sons	35	25.41	7,283
Robert Trafton Co.	16	29.86	7,255
Martella & Buzzini	30	27.69	7,233
Tom Da Rosa	88	28.59	7,222
West Coast Farms	25	26.53	7,216
J. M. Thorne	16	29.29	7,199
Earl Fiscalini	44	26.19	7,124
Edward A. Johnsen	8	30.32	7,095
Ambrosini & Pisoni	20	26.84	7,075
Martinus & Martinus	80	26.63	7,062
Robert Heess	29	25.59	6,976
J. A. Ferrasci	25	26.24	7,038
Toro Farms	43	25.28	7,013
Henry B. Roper	35	25.22	6,936
Earl Fiscalini	26	27.90	6,897
Fanoe Bros & Sons	28	26.09	6,872

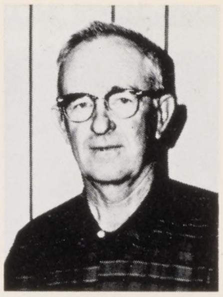
67 Honor Roll

factors. Consequently the names listed from Districts II and III are especially noteworthy.

Those growers pictured represent the top two growers from each District. Not pictured are: District I, Owen Rice and William Whitney; District II, Richard Tanaka.

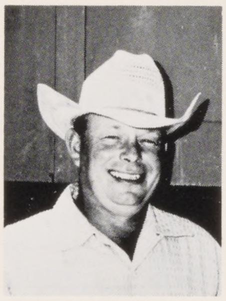


Fred Heidrick - D. III

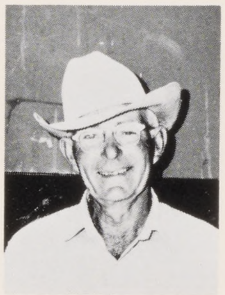


Joe Heidrick - D. III

Sam Tanaka - D. II



Bob Bulkley - D. III



Irvin Bulkley - D. III

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
J. J. Crosetti	61	26.85	6,847
Primo Baggiolini	35	27.62	6,756
Tom Da Rosa	75	29.80	6,580
Wm. D. Crinklaw	25	29.16	6,258
Emil C. Meyer	62	27.47	6,109
Martin R. Ramseier	53	25.38	5,751
M. G. Da Rosa	25	26.21	5,672
Breschini Co.	20	25.09	5,620
Albert C. Hansen	30	24.99	5,503

DISTRICT II — MANTECA

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Albert Fonseca	90	31.69	9,982
Tanaka Farms	45	29.55	9,373
David Vana	28	29.75	9,342
Robertson & Sons	77	30.94	9,325
Murata Bros.	106	30.18	9,211
Kaiser & Lindeman	51	31.27	9,112
Joe Sabbatini	74	28.75	8,987
Clarence A. Nilsson	74	28.74	8,978
Chase Bros.	17	28.39	8,784
Stephen Pellegri	61	31.63	8,730
R. & J. Dondero	60	26.12	8,682
Manuel Amaral, Jr.	33	28.17	8,676
Robert Norman	26	27.23	8,632
Fumio Nishida	8	34.86	8,583
J. & R. Solari	37	27.36	8,443
J. & R. Solari	37	26.31	8,440
Enos & Woodward	34	28.03	8,387
George Mitsuda	78	25.37	8,093
Ronald Ohm	39	27.69	7,991
Ronald L. Davis	20	25.42	7,956
Dwayne Petz	34	29.37	7,918
Manuel Amaral, Jr.	62	26.52	7,723
Kaiser & Lindeman	73	27.53	7,719
Fred Fukano	115	27.45	7,713
Thomas E. Alderson	40	29.46	7,165
Frank Ormonde	221	25.36	7,091
Maciel Bros.	92	25.37	6,819
Lester Rodgers	80	25.26	6,608
Peter A. Stolich Co.	23	26.15	6,585

DISTRICT III — WOODLAND

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Bulkley Ranch	56	26.20	8,258
Heidrick Farms, Inc.	363	26.83	7,942
Clark Davis	51	28.34	7,646
Oji Bros. Farm, Inc.	103	28.14	6,827
Oji Bros. Farm, Inc.	154	25.55	6,796
Gary Alvernaz	35	25.36	6,477
Oji Bros. Farm, Inc.	58	25.15	6,182
Roger D. Moore	56	26.30	5,102

DISTRICT IV — MENDOTA

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Santa Rita Ranch Co.	159	29.69	9,726
D. T. Locke	55	33.92	9,620
Bonaza Farm	73	32.96	9,130
Sorg Bros.	66	29.09	8,995
Emory O'Banion	16	29.70	8,809
Ralph Forrest	41	34.55	8,796
Newhall Land & Farming	65	29.27	8,793
Kenneth McClanahan	37	30.87	8,730
Bonanza Farm	73	28.68	8,702
Herman & O. L. Walls	41	35.06	8,632
Timco	673	28.62	8,557
Manuel Garcia	16	33.29	8,549
Newhall Land & Farming	30	33.75	8,539
Joe G. Fanucchi & Sons	53	31.21	8,427
Double L Farms	38	31.57	8,372
D. T. Locke	17	28.32	8,326
Bob Teicheira	39	31.42	8,276
Hugh S. Jewett	24	31.77	8,222
J. Howard Porter	30	32.66	8,152
Irwin R. Efird	55	35.68	8,142
Newhall Land & Farming	141	26.26	8,104
Keith Erskine	274	26.05	8,065
Paul W. Demkey	57	31.61	8,023
Hugh S. Jewett	73	28.86	8,017
Newhall Land & Farming	29	30.39	7,993
Wolfsen Land & Cattle Co.	179	27.41	7,971

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
Houchin Bros. Farming Co.	66	31.28	7,970
Kern County Land Co.	58	34.13	7,966
W. R. Greenlee Farming	85	25.97	7,869
Vignolo Farms	84	27.03	7,850
Mitchell & Johansen	73	29.99	7,839
Vignolo Farms	86	26.20	7,745
Kenmar Farm	134	27.86	7,689
Ralph Forrest	43	26.95	7,659
J. Howard Porter	58	28.02	7,649
Johnson & Johnson	35	36.33	7,644
Bonanza Farm	151	25.11	7,598
Sanders & Sanders	119	27.16	7,589
Kenneth McClanahan	25	26.53	7,561
Clay Thurman & Percy Smart	54	31.46	7,550
Coalinga School Farm	6	25.38	7,538
Palm Farms, Inc.	160	28.40	7,503
W. L. Simmons	72	27.43	7,499
Costerisan Farms	231	26.32	7,480
Houchin Bros. Farming Co.	79	29.56	7,479
Jake Kroeker Sons	42	31.51	7,474
William Fahey	34	27.47	7,422
Barnard Bros.	80	25.90	7,413
Roy Hensen & Sons	91	28.77	7,411
Sunset Ranch	288	29.87	7,360
Pomeroy & Jewett	190	27.53	7,345
R. H. Garlow Farms	137	28.05	7,338
Kern County Land Co.	147	26.48	7,282
Roy Hanson & Sons	39	27.74	7,279
Mitchellinda Ranches Inc.	68	33.26	7,277
Sanders & Sanders	72	27.10	7,263
Margaret Michels	48	25.90	7,262
D. T. Locke	100	26.61	7,249
Stanley Hefner	19	33.29	7,204
Lee Roy Janzen	72	27.94	7,203
Crettol Farms	37	30.57	7,202
F. W. Handel Farming	145	26.42	7,197

(Continued on next page)

THE 1967 HONOR ROLL

(Continued from page 19)

Grower	Acres Harvested	Tons Per Acre	Lbs. Sugar Per Acre
J. B. Hawkins Ranch	156	25.68	7,165
G. E. Paxton	12	28.06	7,144
J. G. Boswell Co.	291	33.31	7,135
H & H Farms, Inc.	35	29.13	7,090
Chase & Harmon Farms	88	30.69	7,083
Destefani Bros.	32	34.06	7,064
N. L. Ritchey	147	27.23	7,058
John T. Laningham	41	27.70	7,030
Hugh S. Jewett	42	25.22	6,991
Tracy Ranch, Inc.	73	30.77	6,979
Roy Hensen & Sons	105	25.57	6,975
George Bassett, Jr.	24	26.57	6,945
Hammonds Ranch, Inc.	34	28.46	6,933
Kern County Land Co.	34	25.49	6,933
Double L. Farms	163	27.01	6,920
A. H. Wegis & Sons	70	25.33	6,905
Ralph Terry	51	30.05	6,899
Joe G. Fanucchi & Sons	76	29.31	6,853
Spreckels Sugar Co.	11	25.89	6,850
Palm Farms, Inc.	58	28.27	6,830
Lester P. Terry	30	35.09	6,814
Markarian Farms	78	27.11	6,783
Costerisan Farms	48	28.30	6,769
Houchin Bros. Farming Co.	204	27.80	6,767
Roy Hensen & Sons	72	26.70	6,739
Kern County Land Co.	75	26.03	6,726
James W. Kalpakoff	26	26.98	6,664
Hughes & Wood	15	30.65	6,663
Newhall Land & Farming Co.	37	25.83	6,628
Frick Bros.	302	25.04	6,591
Correia Bros.	38	26.62	6,559
Banducci Farming Co., Inc.	123	27.14	6,546
Kern County Land Co.	152	26.81	6,520
Tracy Ranch, Inc.	150	27.95	6,490
Destefani Bros.	38	28.53	6,488
Tracy Ranch, Inc.	86	26.22	6,419
H & H Farms, Inc.	78	26.33	6,409
H & H Farms, Inc.	61	25.51	6,388
Destefani Bros.	65	25.76	6,316
Schramm Ranches, Inc.	100	27.37	6,312
Jake Kroeker Sons	73	25.62	6,308
Southlake Farms, Burrel Ranch Div.	80	26.38	6,183
Frank Heuer	44	28.18	6,143
Clarence Ritchie	50	25.67	6,135
John B. Caussa	13	26.28	6,086
Ed Nagel	39	27.84	6,019
W. M. & D. L. Colson	76	25.33	5,912
Desert Ranch	82	25.59	5,911
R. H. Garlow Farms	36	25.22	5,826
E. O. Mitchell, Inc.	75	25.21	5,647
Fredlo Farms	34	28.00	5,617
Bruno Cauzza	19	28.19	5,604
Hank Anderson	75	26.77	5,477
J. L. Heath	71	25.14	5,149
Fredlo Farms	39	25.05	5,125
C. J. Shannon & Sons	167	26.32	5,096
Nichols Farms, Inc.	310	25.31	4,571

DIAL-A-BUG

Kern County Farm Adviser Initiates New Service

J. Hodge Black, Kern County Farm Advisor and Entomologist has established a new service called "Dial-A-Bug". By dialing a Bakersfield number one can obtain an up to date appraisal of the "bug situation" in Kern County areas. The three minute taped report contains information on insect populations, potential outbreaks, and control measures.

Mr. Black says "the services purpose is not to make specific recommendations but to pass along timely tips and techniques which I have observed as being effective or ineffective against a particular problem."

Mr. Black said the idea came about when an ever-increasing demand for on-farm consultation as well as an increasing load of problem solving research made it difficult for growers and industry personnel to contact him for consultation during peak seasonal insect activity. Since the majority of his telephone inquires were closely related to; (1) what is the current situation, (2) how to determine control needs, and (3) what is doing an adequate job of control? He found that on many calls he was just repeating himself and that a pre-recorded tape might prove worthwhile.

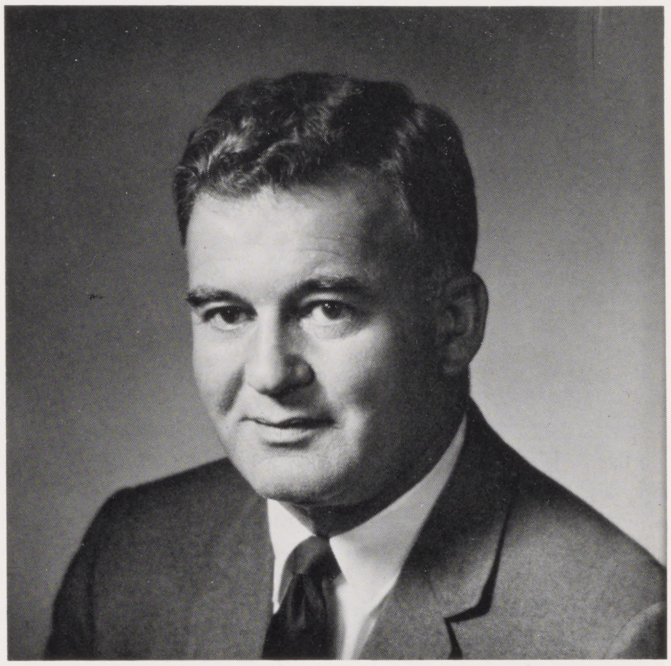
A trial program was set up in the summer of 1967 and ran until late fall, The three minute tapes were generally changed every other day and if the situation warranted, were changed daily. The material in the reports was based on Mr. Black's observations as well as other farm advisors, chemical company fieldmen, supervised pest control people, test plot workers, and in addition information from the U. S. Cotton Research Station at Shafter, whose combined 30-35 light traps yield daily information on insect populations. The response to the service was overwhelming and it was decided to continue it this year.

The cost of the program is negligible. Mr. Black said the trial run last year cost a total of $120 and the largest part of this expense was an installation charge for the equipment. Once the equipment was in, the cost ran about $12 per month. Considering that 50-60 calls per day were received during peak usage, that represents a pretty reasonable cost per call.

The Dial-A-Bug number is: Area Code 805, 323-5457.

J. Hodge Black is shown preparing a "Dial-A-Bug" recording.

WALTER H. BUCKINGHAM



WALTER H. BUCKINGHAM

It is with a deep sense of loss that we report the death of Walter H. Buckingham, District Manager, Salinas. He died as a result of injuries sustained in an automobile accident near Greenfield, California on June 21, 1968.

Mr. Buckingham was a native of Vacaville, California where he attended local elementary and high schools. He obtained a degree in General Agriculture from the University of California, Davis and served as a Lieutenant in the United States Navy from January, 1943 through March, 1946. He worked for the Farm Security Administration and joined Spreckels Sugar Company in 1946 as a Field Superintendent in the Grimes area of District III, Woodland. In 1948 he was promoted to Agricultural Superintendent and transferred to Bakersfield, California. In 1949 he was transferred back to Woodland where he served as Agricultural Superintendent until 1956 when he was promoted to the position of Agricultural District Manager of District I, Salinas.

Mr. Buckingham was active in civic affairs. He was a member of Salinas Lodge No. 614, the BPO Elks, the Salinas Rotary Club, a director of the Monterey Bay Area Boy Scout Council, a member and founder of the Corral de Tierra Country Club, a member of the Monterey County Water Advisory Commission and chairman of the Community Relations Committee for the California Rodeo. He was a member of the Chamber of Commerce and served on its board of Directors. In 1961 he served as President of the Salinas Area Community Chest drive.

Mr. Buckingham is survived by his widow, Barbara S. Buckingham; three daughters, Mrs. Susan Kelley, Mrs. Patricia Bleier, and Miss Cheryl Buckingham, and one son, Charles F. Buckingham, all of Salinas. Additional survivors include his mother, Mrs. Ione Buckingham of Vacaville, a sister, Miss Nancy Buckingham of San Jose, a brother, Morris H. Buckingham of Atherton, and a grandson, Michael Kelley of Salinas.

FOURTH EDITION

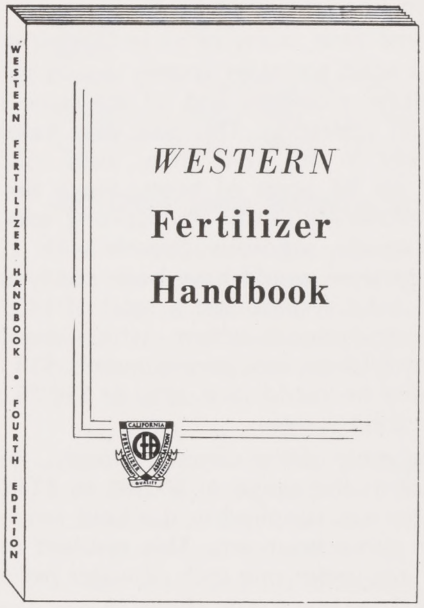
Western Fertilizer Handbook Copies Still Available

Copies of the fourth edition of the Western Fertilizer Handbook are still available. This comprehensive manual is a non-profit publication of the California Fertilizer Association.

Some of the major topics covered include soils, water, organic matter, the plant and the cell, plant food elements, diagnostic tests for soil and crop problems, commercial fertilizers and agricultural minerals, western law as relating to fertilizer materials, and extensive tables and conversion factors.

The handbook is available for $2.00 from:

The California Fertilizer Association,
2222 Watt Avenue,
Sacramento, California 95825


WESTERN FERTILIZER HANDBOOK • FOURTH EDITION
WESTERN
Fertilizer
Handbook
CALIFORNIA

Efficient Application of High Cost Water With Solid Set Sprinklers

By Morris M. Ball

Mr. Ball is a Field Superintendent in the Arvin and Conner areas of the Bakersfield District.

The followers of the theory, "beet roots will go down for moisture if an irrigation is delayed," would probably have been unsuccessful sugar beet producers. Many growers have learned the hard way that beet roots will not grow through dry soil and that growth stoppage will occur if excessive dry conditions are prevalent.

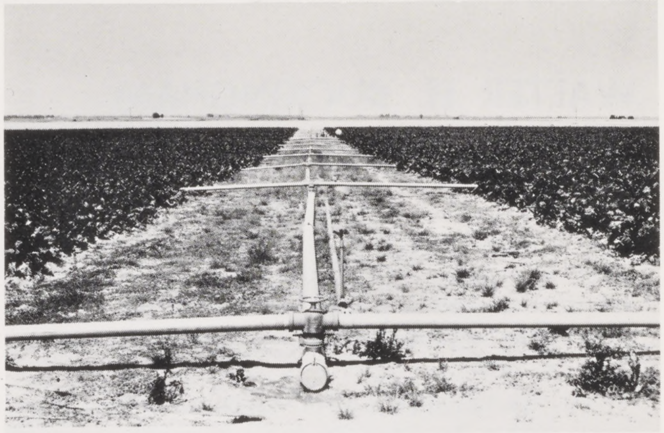
A better approach to successful irrigated farming is to apply adequate amounts of water on a timely basis. The end result of this approach is scheduled irrigations that permit steady plant growth throughout the growing season. Through regulated watering, a continual supply of dissolved mineral nutrients are made available that would not otherwise be utilized if the soil were dry or if only minimum moisture were present. As new root tissue is the prime supplier of the dissolved nutrients to the plant, production of this new tissue is extremely important. If growth is hindered by periods of drought, the new root tissue will not be produced.

Just as damaging as insufficient amounts of water are infrequent, heavy irrigations that completely saturate the soil. This type of watering usually creates a lack of oxygen in the rooting zone and stops plant growth. It also induces rotting and the spread of Southern Sclerotium Root-rot, if present.

For some time, many of us in District 4 have wondered if a solid sprinkler system would solve some of our irrigation problems and, at the same time, be an economical operation. This past year Ralph Forrest, a new grower in the Arvin area, used solid sprinklers on 43 of his 84 acres of beets. Since the soil Ralph farms is extremely sandy, maintaining adequate moisture for steady, vigorous growth with conventional sprinkler systems would have been costly and difficult. Since the solid system cost a total of $43.00 per acre and the conventional system, which requires a great deal of hand labor, cost approximately $53.75 per acre, Ralph found he could save 20% or $10.75 per acre by using the solid system.

During most of the summer months, Ralph's water costs were in the range of $12.00 to $14.00 per acre foot. Water was supplied to the beet crop every three days with three hour sets. This resulted in the application of just under one inch of water per irrigation.

Another reason Ralph chose to use a solid system in this particular field was due to a late planting date of March 10th. Thinning was completed by the 1st of May and the solid system was placed in the field to push the crop and to use all available water in the most efficient way possible.



This solid set sprinkler system was used to apply one inch of water per irrigation. The field was irrigated every three days.

Being a progressive and cost-conscious grower, Ralph also used good nitrogen management and cultural practices and was able to produce an outstanding 26.95 tons of clean beets per acre with a 14.21 sugar percentage. Top results such as these influenced other growers to use solid sprinkler systems. This year, in the Arvin area alone, five growers with approximately 473 acres of beets are irrigating with solid systems. Each of these individuals feel they have reduced their water costs considerably, have increased their irrigation effectiveness, and have made better use of applied nitrogen.

Atrazine Damage

Considerable damage to sugar beets from residual atrazine usage on corn and sorgham has been noted in Northern California this year. Many fields sustained damage ranging from small area losses to total abandonment.

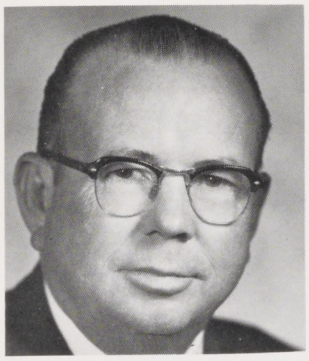
Typical damage to the beets occurs at the dicotyledon stage or later. The outer margin of the leaves begin to show a definite chlorosis or burning and soon after the young beets generally die.

The materials label clearly states the user should not plant any other crop, except corn or sorghum, 18 months after initial application.

Bill Fisher, Fresno County Farm Advisor, says the material is not recommended for use in the San Joaquin Valley primarily because of its long residual properties.

When using any herbicide, insecticide, etc., read and follow the label requirements - they are for your protection. If you have any doubts contact your Field Superintendent or your local County Farm Advisor.

AGRICULTURAL STAFF CHANGES



J. Byron Larsen

Byron Larsen Now District Manager

☐ J. Byron Larsen has been designated as Agricultural District Manager for District I, Salinas to replace the late Walter H. Buckingham. Mr. Larsen joined Spreckels Sugar Company in 1936 as a Ranch Superintendent in the King City area. In 1942 he was appointed to the position of Field Superintendent in the area from Soledad to San Ardo. In 1948 he was promoted to the position of Assistant Agricultural Superintendent in District I, Salinas and from 1956 until the present served as Agricultural Superintendent.

Mr. Larsen is a native of Lewiston, Utah. He attended Logan High School and Utah State University. He majored in Business Administration and minored in Economics and Accounting.

He is active in community activities. In the past he was a member of the King City Rotary Club, he was active in the Boys Scouts of America for 21 years during which he was a Scoutmaster, Troop Committeeman and Vice Chairman of the Gablain District, he was a member of the King City Grammar School Board for 6 years, 2 of which he served as President, and was a member of the Monterey County School Redistricting Committee for 3 years. He presently is a member and past president of the Salinas Exchange Club, he is a member of the B.P.O. Elks Lodge No. 614, a member of the Salinas Rodeo Committee and Treasurer of the Salinas Valley Fair Board.

Mr. Larsen and his wife Frances reside in Salinas. They have one married daughter and three grandchildren.

William H. Hodson

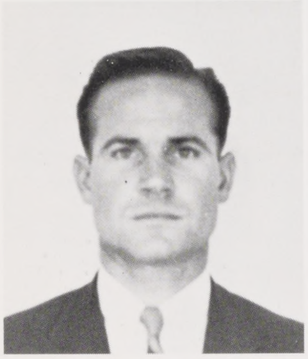
Bill Hodson To Imperial Valley

☐ William H. Hodson, formerly Field Superintendent in the Goshen and Stratford areas of District IV, Mendota, has been promoted to the position of Agricultural Superintendent in the Imperial Valley.

Mr. Hodson is a native of Sacramento, California where he attended the C.K. McClatchy High School. He majored in Agronomy at the University of California at Davis and was a Major in the United States Marine Corps where he served as a naval aviator.

He joined Spreckels Sugar Company in 1952 as a Field Superintendent in District III, Woodland. In 1963 he was transferred to the Goshen area of District IV, Mendota where he served until the present.

Mr. Hodson, his wife Marjorie and three sons, Richard, William and James, will reside in Brawley, California.



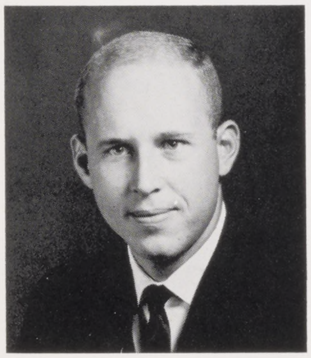
Melvin H. Voos

Mel Voos Transferred to Salinas

☐ Melvin H. Voos, formerly Assistant to the Agricultural Manager, San Francisco, has been assigned the responsibilities of Agricultural Superintendent, District I, Salinas. He joined Spreckels Sugar Company in January, 1963 as an Assistant Field Superintendent in District II, Manteca. In May, 1963 he was transferred to District III, Woodland as a Field Superintendent. In December, 1964 he was appointed to the position of Assistant to the Agricultural Manager and transferred to the head office in San Francisco.

Mr. Voos is a native of Elk Grove, California where he attended the Elk Grove High School. He attended the University of California at Davis and majored in Agricultural Education. While a 1st Lieutenant in the United States Army, he served as a helicopter pilot.

He is a member of the American Society of Sugar Beet Technologists and the Cal Aggie Alumni Association.



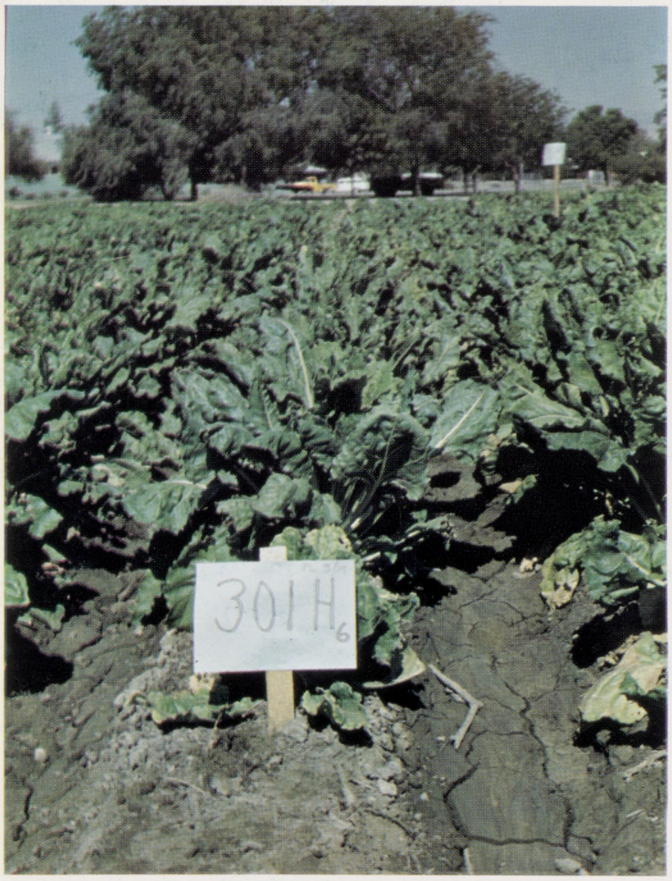
William W. Story

Bill Story Joins Manteca Staff

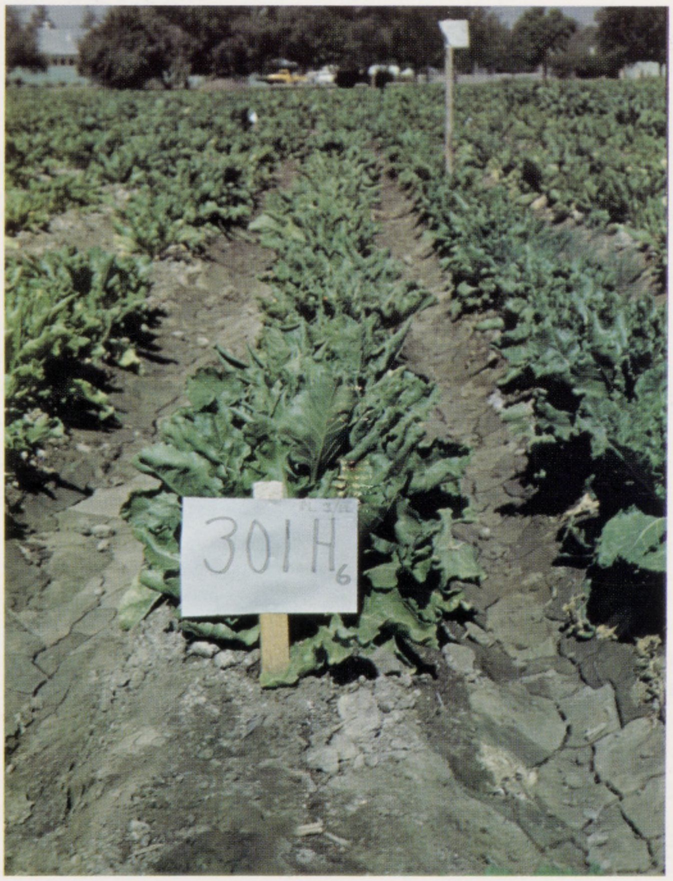
☐ Mr. William W. Story recently joined Spreckels Sugar Company's Agricultural Staff as an Assistant Field Superintendent. He has been assigned to District II, Manteca where he will work with the field staff.

Mr. Story is a native of Greenville, California where he attended local schools. He attended the University of California at Davis where he majored in Agricultural Education.

Mr. Story and his wife Margaret will reside in Manteca.



This curly top resistant variety had a pre-plant application of Thimet and when harvested yielded in excess of 20 tons per acre.



The same variety as that shown on the left but without pre-plant Thimet. This check strip yielded 11 tons per acre.

CURLY TOP VIRUS CONTROL

(Continued from page 17)

The preplant application, as shown in table 3, provided nearly as effective curly top control as the combination of preplant plus as many as three topical applications. This does not mean, however, that the topical application has no place in a curly top program. Many times a topical application of a systemic insecticide properly timed with the leaf hopper flight could give worthwhile insurance protection to even larger sized early planted beets in the curly top areas.

In conclusion, the results of numerous experiments conducted under a wide range of planting and curly top conditions have shown that a preplant application of thimet provides good insurance against curly top and at a very reasonable cost. Every grower who plants sugar beets in a curly top area should adhere to the following program:

1. Plant early in the growing season—October—to February 1.
2. Use a curly top resistant variety.
3. Place 10 pounds of thimet per acre (10% material) approximately 5 inches directly below the seed.
4. Irrigate frequently to get beets off to a good start and keep them in a vigorous growing condition.
5. Follow the movement of the beet leaf hoppers from their breeding grounds in the spring. (Consult with your fieldman who is working closely with the State Beet leaf hopper representative).
6. If a late and heavy spring flight is forecast, be prepared to apply a topical application for additional protection.

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SPRECKELS SUGAR BEET BULLETIN

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

JA 25 '69

General News and Comment

Salinas Valley - Harvest is being completed on what will probably be the finest crop of sugar beets ever raised in the valley. It appears that the final yield average will be over 32 tons per acre with a sucrose content in excess of 15 percent. Monterey County is expected to average about 34 tons per acre. 1959 was the valley's previous best year when an average of 29.5 tons per acre and 15.5 percent sucrose was attained.

San Joaquin Valley - Growers in the southern part of the Valley are also completing harvest of their finest crop ever. With harvest 90% completed yields are averaging 23.5 tons per acre and in excess of 14 percent sucrose. 1963 was this areas previous best year when yields averaged some 23 tons per acre and 13½ percent sugar.

State Record - Very little acreage has been harvested in the North San Joaquin and Sacramento Valleys, but better than average yields are anticipated. If such is the case a new statewide record should be achieved. The last statewide record crop was in 1959 when an average of 23.7 tons per acre and 15.7% sucrose was produced.

National Production - The latest USDA Crop Production Report estimates a record U.S. harvest this year, with the "all-crops" production index at 3 percent above last year's all-time high. Prospects for food grains and oil seeds continue at record levels, and the output of feed grains is expected to be the second highest on record.

Estimates included a record 1-billion-bushel soybean crop, as well as record crops of peanuts at 2.4 billion pounds and rice at 106.9 million hundredweight. The corn estimate was revised downward slightly to 4.4 billion bushels, with a record average per acre yield at 79.4 bushels. A near-record crop of sorghum grain was projected at 755 million bushels. Below average crops are indicated for cotton and tobacco.

Beet sugar production will fall nearly 100,000 tons short of the last government estimate of 3,600,000 tons but will probably surpass the 1964 record crop by approximately 200,000 tons. It is generally felt among government officials that for the first time in three years the beet sugar inventory on January 1 is likely to be within the range considered appropriate by the Congress.

USH-9 Seed - The availability of USH-9 seed which was developed by U.S.D.A.'s Dr. John McFarlane will be limited for the 1969 crop year plantings. Untimely rains during the seed harvest in Oregon's Willamette Valley reduced yields approximately 40 percent. The seed that is available will be allocated to those areas in which the threat of yellows is the most prevalent.

SPRECKELS SUGAR BEET BULLETIN

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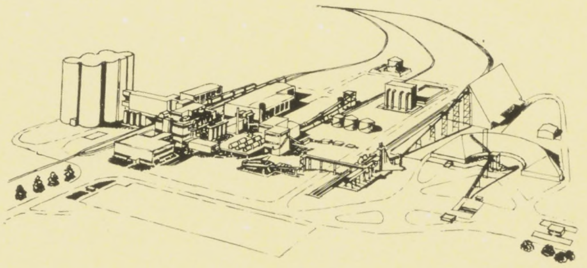

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Cover Comment: The harvest of a bumper crop is nearing completion in the Southern San Joaquin Valley. This field which was located west of Mendota yielded in excess of 30 tons per acre and was one of the many outstanding fields which helped make 1968 a record crop year in the Southern San Joaquin Valley. The harvester is owned by a custom operator from Kerman, Jay Swallow. The truck is owned by George Pearce of Bakersfield.

Herbicide Residues In California Agricultural Soils

Reprinted from "California Agriculture"

"California Agriculture" is published by the University of California, Division of Agricultural Sciences. The study was made by A. H. Lange, Weed Control Specialist, Agricultural Extension Service, University of California, Riverside; B. Fischer, Farm Advisor, Fresno County; W. Humphrey, Farm Advisor, Orange County; W. S. Seyman, Farm Advisor, Santa Clara County, and K. G. Baghott, Farm Advisor, Modoc-Siskiyou Counties.

Aside from an apparently irreversible adsorption not yet clearly understood, herbicides leave the root zone of plants through evaporation from the soil surface, deep leaching, chemical (and biological) destruction, or by the removal action of resistant crops. Herbicide removal from soil by any of these means is not independent. Considering variations in soil types, in rainfall, in irrigation practices, in methods of application, and in subsequent soil preparation, it is quite likely that it will be some time before accurate predictions can be made on how long most herbicides remain in the soil. However, some guidelines are available from the chemical industry and from other areas of research. The early greenhouse work on a number of California agricultural soils emphasized the importance of organic matter and clay content of soil in the over-all activity of herbicides.

This report summarizes seven field experiments at six locations in California. Test sites included a wide range of soil types and environmental conditions. The 13 herbicides were applied in small (5- by 5- or 5- by 10-ft.) plots in the spring of 1964, from March through July. The various crops were harvested, counted, and weighed at 5 to 6 weeks after seeding. Herbicidal phytotoxicity ratings were recorded during the growth of each crop. The organic matter content of the soil ranged from 1.3% to 12.6%; sand, from 24% to 60%; silt, from 27% to 56%; and clay, from 9% to 32%. The amount of moisture received was approximately 30 to 45 inches (depending upon rainfall, the number of croppings, and test locations). The most representative data were obtained from the 0 to 10 phytotoxicity ratings and the stand counts. The results presented here were taken from the average phytotoxicity rating and the stand counts and converted to a 0 to 10 scale.

The range of crop phytotoxicity varied greatly between chemicals at the six locations. Bromacil (Hyvar X), simazine, and picloram (Tordon) showed injury for the longest periods of time to the broadest spectrum of crops.

Crop sensitivity to specific herbicides varied greatly. The residual characteristics of trifluralin (Treflan), for example, varied with the test plant species. Milo showed some sensitivity for about 18 months after the application of 1 lb. of trifluralin per acre in one test, but toxicity dropped to a minimum in about one year in most tests. In sugar beet tests, toxic effects were minimal at about eight months, and at about six months for barley. The crop most sensitive to each herbicide was used to express herbicide disappearance.

Effects of location differences were also notable. Diuron, for example, was phytotoxic for only about three months at Tulelake, but for well over two years at both the South Coast and West Side field stations. A brief summary of test results with individual herbicides follows:

Simazine is slow to break down in soils, and appeared to last well over two years at a 4-lb-per-acre rate (table 3). Phytotoxic effects declined after 12 to 18 months at all locations except the West Side Field Station. The effect of organic matter was not as apparent in tests with simazine as with some of the other herbicides. Barley, alfalfa, sugar beets, and tomatoes were among the crops most sensitive to simazine (table 1).

Diuron (Karmex) is also used as a long-term soil sterilant, but in this study it averaged out showing less herbicide residue than simazine. Locations with soils having 4.5% or less organic matter showed diuron persistence, however. All plants were sensitive to diuron initially (table 1), but by a year after treatment, a number were showing some tolerance—particularly alfalfa and milo (table 2). Tomatoes, sugar beets, and barley were more susceptible to injury.

Prometryne (Caporal) is used commercially as a short-term selective herbicide, and showed a residual picture of considerable variation. The loss in chemical activity at 1 lb per acre was quite rapid. However, at the 4-lb-per-acre rate, the activity varied greatly from location to location—lasting over two years at the West Side Field Station. At the 4-lb-per-acre rate the chemical disappeared within three months at most of the other locations. Prometryne showed least toxicity to cotton initially (table 1) and milo later (table 2). It was most phytotoxic after one year to tomatoes and wheat.

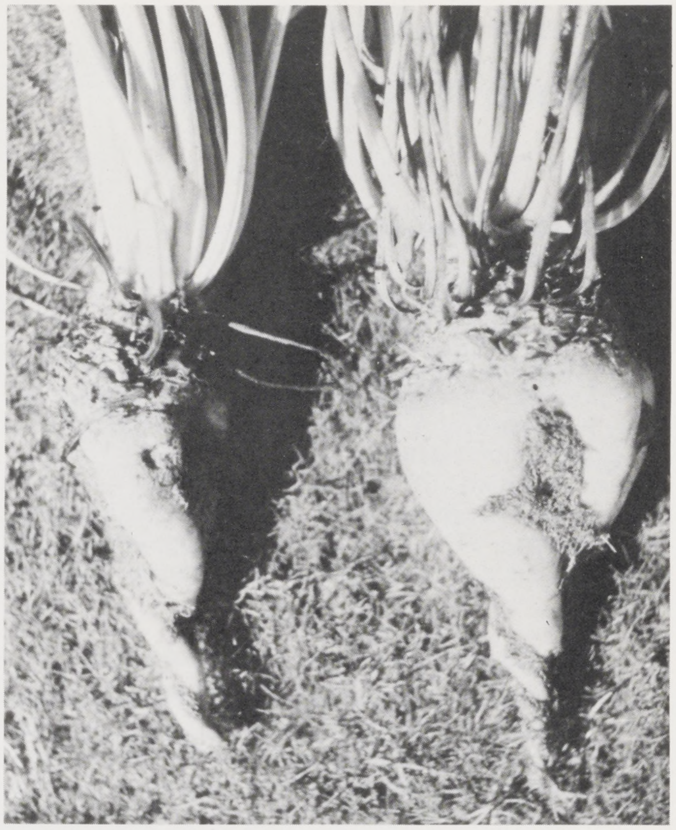
Bromacil (Hyvar X) is a long-term, broad spectrum soil sterilant, and generally lasted in the soil longest of all herbicides tested. At every location, the bare plots of this herbicide were visibly obvious (table 3). At the 1-lb-per-acre rate some selectivity was evident at one year for milo and barley (table 2). This herbicide will find little, if any, use in crop rotation because of its extremely long residual effects.

Trifluralin (Treflan) is a highly effective selective herbicide that showed considerable variation in effects on crops and in test location effects. Organic matter did not appear to have a great influence on the disappearance of trifluralin from the soil. Because of the variable effects from location to location, other factors are believed to be involved—such as clay quantity or quality, since soils low in clay (Fresno and South Coast Field Station) showed the most rapid breakdown. The soil with the most clay (West Side Field Station) showed the longest carry-over of trifluralin. At 1 lb per acre, there was little trifluralin residue problem after one year in any crop. At higher rates, the crops showing least tolerance were milo and sugar beets. Those showing the most tolerance were alfalfa, beans, safflower, lettuce, melon, tomatoes, barley, and wheat (table 2).

DCPA (Dacthal) is one of the most selective herbicides—and showed few problems from herbicide residues in the soil at 8 lbs per acre. In milo, however, DCPA was active in the soil up to about a year. Milo was more sensitive than most of the broadleaf crops. Although the damage to most crops was minimal, there were indications of the presence of DCPA longer than a year at 32 lbs per acre (table 2). Most resistant were alfalfa, beans, safflower, tomatoes, and barley. Most susceptible were milo, sugar beets, and lettuce. Injury to barley was noted in stubbing of the roots, sometimes without noticeable effect to the tops—therefore, under dry farming this herbicide might prove to be much more damaging to grain (these tests were conducted with sprinkler irrigation, for the most part adequate for normal growth).

Diphenamid (Dymid or Enide) is another very selective herbicide which showed considerable variation between crops and locations. Barley, one of the most sensitive crops, showed the presence of diphenamid 12 to 16 months after application even at 4 lbs per acre. At the West Side Field Station, there were indications that effects of diphenamid persisted for two years on sensitive crops. The over-all picture indicated that diphenamid had disappeared after one year (table 3). Even at 16 lbs per acre, reports from three of five locations indicated no residue problems. However, problems even at one location would suggest caution with its use and emphasize the importance of planting resistant crops following the use of diphenamid. Most resistant to injury were tomatoes, cotton, alfalfa, and beans (table 1); most affected were barley, milo, and sugar beets as well as lettuce and melons. Although tested at fewer locations, cotton appeared quite resistant to diphenamid.

Bensulide (Prefar) is another very selective herbicide. Bensulide, like diphenamid, was active in the soil for a long time at some locations. There was usually an appreciable amount of residue for well over a year after applications at 4 lbs. per acre. Chemical activity ranged from a few months to more than two years on a few crops like milo (table 3). An herbicide with this kind of variability could only be used in a rotation with resistant crops. Alfalfa, beans, tomatoes, lettuce, cotton, melon and safflower were quite resistant to bensulide; wheat and barley were intermediate; and milo and sugar beets were susceptible (table 1).



Typical trifluralin (Treflan) damage to sugar beets is the corkscrewing or twisting of the root as shown above. Stunted growth and reduced stands are also common. Damage normally occurs when a residue of the material remains in the soil from application on a previous crop.

Pyrazon (Pyramin) was another selective herbicide in these tests, that showed a wide range (in disappearance time) for susceptible crops. In tomatoes or melons, very little residue problem existed after about eight months (even at the four-times-normal rate of 16 lbs. per acre). The West Side Field Station again proved to be an exception, with substantial residue even two years after applications at 4 lbs. per acre. These results were substantiated by chemical analysis of the soil. After two and a half years, however, only the 16-lb-per-acre rate showed a residue on susceptible crops. Among the crops studied, melon, lettuce, tomato, safflower, beans, alfalfa, and barley were the most sensitive, and milo and sugar beets most resistant (table 1). At Tulelake, there was no evidence of residual effects on even the sensitive crops after 16-lb-per-acre applications, which again suggests the importance of organic matter.

FW-925 (TOK-E-25) is a nonincorporated selective herbicide that showed few residue problems. However, sufficient herbicide residue remained after a 4-lb-per-acre application to be detected at three months (table 3) and enough remained from the 16-per-lb-acre rate to be detected at one year. Tomatoes appeared to be the most sensitive crop.

Dicamba (Banvel D) is a selective herbicide when used at low rates, at 4 lbs per acre, residues were apparent on broadleaf crops for more than a year. Although

TABLE 1. RELATIVE CROP RESISTANCE TO HERBICIDES

Initial phytotoxicity to first crops planted up to two weeks after herbicide application and incorporation—averages of all locations having crops planted.

Herbicide	Rate lbs/A	Average phytotoxicity*					
		Barley	Milo	Sugar beets	Alfalfa	Tomatoes	Cotton
Simazine	4	9.1	6.3	9.9	10.0	9.9	7.2
Diuron	4	8.5	9.0	8.5	7.4	9.5	8.5
Prometryne	1	7.5	5.6	8.0	4.5	7.2	4.0
Prometryne	4	9.6	9.8	10.0	8.5	10.0	5.0
Bromacil	1	9.5	8.8	9.8	10.0	10.0	9.2
Bromacil	4	9.9	9.9	10.0	10.0	10.0	10.0
Trifluralin	1	5.2	8.9	8.5	5.0	7.5	3.8
Trifluralin	4	7.2	9.4	9.6	6.3	8.1	6.8
DCPA	8	1.7	7.1	6.1	1.8	5.1	4.0
DCPA	32	2.7	9.8	9.2	4.8	7.0	2.8
Diphenamid	4	6.9	7.1	5.5	3.5	3.6	3.8
Diphenamid	16	8.7	9.2	7.4	3.0	5.2	4.8
Bensulide	4	2.3	5.3	4.5	2.5	3.3	2.8
Bensulide	16	4.6	8.6	9.2	4.0	5.5	4.0
Pyrazon	4	2.7	1.8	1.1	3.8	6.1	3.8
Pyrazon	16	7.0	4.7	6.3	7.0	9.6	6.0
FW-925	4	2.1	1.7	1.8	2.0	3.0	2.5
FW-925	16	6.1	5.8	4.2	4.0	6.4	1.8
Dicamba	4	8.7	9.2	9.6	10.0	9.6	10.0
Dicamba	16	9.5	10.0	10.0	10.0	10.0	10.0
Picloram	1	5.9	7.9	10.0	9.8	10.0	10.0
Picloram	4	8.6	9.4	10.0	10.0	10.0	10.0
TBA	4	4.6	4.1	6.1	9.0	8.1	1.8
Check	–	0.1	2.9	1.0	0.2	1.6	2.8

* Average 0–10 phytotoxicity rating on crops where 0 = no effect; 5 = severe chlorosis, stunting, or stand reduction; 10 = all plants dead or no stand.

TABLE 2. RESIDUAL TOXICITY AT APPROXIMATELY ONE YEAR AFTER HERBICIDE APPLICATION AS MEASURED BY AVERAGE CROP PHYTOTOXICITY RATING FROM A NUMBER OF UNIFORM TRIALS

Herbicide	Rate lbs/A	Average phytotoxicity*					
		Barley	Milo	Sugar beets	Alfalfa	Tomato	Wheat
Simazine	4	3.2	1.8	5.6	9.1	4.7	4.2
Diuron	4	3.6	1.9	3.6	0	4.1	2.6
Prometryne	1	0.9	0	0.6	0	0.3	1.6
Prometryne	4	2.1	1.0	1.5	1.8	3.4	3.4
Bromacil	1	2.5	2.0	3.2	4.6	4.6	4.3
Bromacil	4	4.5	4.2	5.5	10.0	6.0	6.2
Trifluralin	1	0.2	2.1	0.4	0.6	0	0.5
Trifluralin	4	1.4	5.3	4.0	1.1	1.8	0
DCPA	8	1.3	0	0.9	2.0	0.7	1.8
DCPA	32	0.8	3.9	3.0	0	1.3	0.3
Diphenamid	4	1.9	1.1	1.9	0	0.7	0.7
Diphenamid	16	2.1	1.4	2.0	0.9	1.8	2.0
Bensulide	4	0.6	2.0	2.3	0	1.4	0.2
Bensulide	16	1.4	5.5	3.7	2.0	0.5	1.3
Pyrazon	4	1.2	0	0.5	0.4	3.9	0.7
Pyrazon	16	2.3	1.4	1.9	0.7	2.8	3.3
FW-925	4	0.4	0	0.5	1.7	0	0
FW-925	16	1.4	1.1	1.5	2.0	1.7	0.8
Dicamba	4	1.1	1.3	0.9	2.4	1.5	0.3
Dicamba	16	1.5	1.9	2.0	2.9	2.4	1.2
Picloram	1	1.4	1.4	4.2	9.6	5.2	1.7
Picloram	4	2.3	2.9	5.3	10.0	5.8	2.5
TBA	4	0.4	0.2	0.7	2.9	0.3	0.5
No. of locations averaged		7	5	6	2	3	2

* Average 0–10 phytotoxicity rating on crops where 0 = no effect; 5 = severe chlorosis, stunting, or stand reduction; 10 = all plants dead or no stand.

initially very toxic to all crops (table 1), even the high rate of 16 lbs per acre caused only minor damage after one year (table 2). Alfalfa and beans were the most sensitive crops and the monocots were most resistant.

TBA (also a benzoic acid) showed a pattern of breakdown very similar to that of dicamba. Since it is normally used at four to five times the level of dicamba, it is quite likely to cause more herbicide carry-over problems than dicamba, and would probably not be used in a cropping situation. Alfalfa, tomatoes, and sugar beets were most susceptible.

Picloram (Tordon) is one of the broadest spectrum potent herbicides yet tested, and it also presents one of the most difficult residue problems of any herbicide studied—particularly under certain conditions. None of the variables measured appears to have any bearing on the residual characteristics of picloram. Under conditions at two locations, 1 lb per acre of picloram was essentially gone in a year (table 3). However, enough hazard is involved to warrant recommending against the use of picloram in crop rotation. The monocot crops were more resistant than the dicots. Lettuce was by far the most sensitive to picloram of the crops studied in the testing program.

SUMMARY

A number of the more selective herbicides such as trifluralin, DCPA, diphenamid, bensulide, pyrazon — although showing measurable response in sensitive crops—may not cause problems when resistant crops are planted. On the other hand, very phytotoxic herbicides such as triazines, the substituted ureas, and the uracils dissipate before most crops can be planted. Simazine and bromacil show little promise for use in rotation. Diuron, under certain conditions (particularly where the organic matter is high), may cause no residue problem. Where organic matter is low, diuron should not be used in rotation. Prometryne, except under certain conditions, has a fairly short residual life. To be completely safe, it would be necessary to know whether or not the crop would tolerate the use of prometryne in rotation, or to test the residual nature of the soil in small test-plots.

GROWTH REGULATORS

The growth-regulator herbicides show little selectivity in broad-leaved crops; however, at very low

(Continued on page 36)

TABLE 3. GROSS SUMMARY OF DATA FROM ONE TO FIVE HERBICIDE RESIDUE TRIALS WHERE + = RESIDUE PRESENT ON ONE OR MORE SUSCEPTIBLE CROPS AND – = NO APPARENT RESIDUAL EFFECT EVEN ON SENSITIVE CROP BY LOCATIONS

Herbicide	Rate lbs/A	3 Months*	12 Months†	24 Mon.†	30 Mon.‡
Simazine	4	+++++	+++++	++	+
Diuron	4	+++++	–++++	+–	+
Prometryne	1	–++++	––––+	––	–
Prometryne	4	+++++	––––+	+–	–
Bromacil	1	+++++	++––+	++	+
BromaciL	4	+++++	+++++	++	+
Trifluralin	1	++–++	––––+	––	–
Trifluralin	4	+++++	+–+++	++	–
DCPA	8	+++++	–––+–	––	–
DCPA	32	+++++	+++++	+–	–
Diphenamid	4	+++++	+––––	––	–
Diphenamid	16	+++++	++–––	+–	–
Bensulide	4	+++++	––––+	––	–
Bensulide	16	+++++	+–+–+	++	–
Pyrazon	4	++–++	–––+–	+–	+
Pyrazon	16	+++++	++–+–	+–	+
FW-925	4	++ ++	–––––	––	–
FW-925	16	++ ++	––++–	––	–
Dicamba	4	+–++	–––––	––	–
Dicamba	16	++ ++	+––+–	+–	–
Picloram	1	++ ++	+–++–	++	+
Picloram	4	++ ++	+–+++	++	+
TBA	4	++ ++	–––––	––	–

* Missing + or – means no conclusive data at the timing, or crops lost for other reasons.

† West Side Field Station (Fresno County) and Tulelake Field Station only. Other locations generally showed no residue except for simazine, bromacil and picloram—after about 18 months or test concluded for other reasons.

‡ West Side Field Station only. Seeded 9/66, rated 10/28/66.

"The Forgotten American"

By Richard G. Capen, Jr.

Mr. Capen is Director of Public Affairs, Copley Newspapers, La Jolla, California. "The Forgotten American" is a reprint of a speech given by Mr. Capen before the Pacific Coast Gas Association Convention held in Salt Lake City, Utah.

There is a new uprising occuring in America today. Some call it the revolt of the middle class. I prefer to describe it as the voice of responsible America. Who is in this group? The 90 percent who are proud Americans and conscientious citizens. The millions who have become the forgotten Americans. They are black, white, and all shades in between.

They started out as the son of a coal miner and became a famous doctor. They worked their way through college by washing dishes. They swept out the lobby of a bank and later became its president. They produce most of American's goods and services. They bear the burden of inflation. They ask very little of their government, but work 2½ hours each day just to pay its cost. They are laborers, office workers, farmers, Republicans and Democrats.

They are the first in line to share with others when catastrophy strikes—whether it be across the street or half way around the world. They are concerned about crime, rising taxes, and inflation. They don't like politicians who overpromise and underfill. They are opposed to teachers who encourage campus riots, and they do not understand the clergymen who preach civil disobedience.

They are ashamed that our nation's capitol must be guarded by thousands of soldiers to prevent it from being burned to the ground. They are unwilling to excuse the actions of criminals just because they were deprived as children. They also are opposed to having policemen ordered to stand by and watch while looters steal.

These forgotten Americans have built this country, but I think they are prepared to do it again, if necessary. It seems incredible that America could have digressed so far so soon. However, this predicament was not created overnight. To a large extent, our crises have been caused by a prevailing attitude of permissiveness — from pampering parents to over-promising political leaders.

We have seen permissiveness in the attitude of right and wrong. No longer need a person be held accountable for his actions. A whole generation of youngsters has grown up under this permissive philosophy which urges instant gratification and the avoidance of unhappiness. Children want what they want when they want it—and they want it now. This permissiveness has extended across the country. In our streets we allowed a "little bit" of law breaking in the interest of free speech and academic freedom.

At the national level, we started out permitting a "little bit" of deficit spending, in the belief that this approach was healthy for our economy. That "little bit" of deficit spending started out at $1 billion, then $8 billion, and, finally $25 billion for the fiscal year. We started out by tolerating a "little bit" of destructive criticism on the war in Vietnam—only to encourage the enemy to believe that we were seriously divided at home, that we didn't have the will to win. For too long now we have catered to those who expect something for nothing. For too long now we have tolerated the mediocre and the irresponsible. Some are deliberately unclean and unproductive. Others strive to be unsuccessful, with failure adopted as a goal.

We are so reluctant to infringe upon the rights of others that we have overlooked injuries to innocent people just because the hopes of all the poor and prejudiced have not been fulfilled. Some Americans have become obsessed with a seemingly endless concern for those who refuse to help themselves. By focusing so much attention upon such misfits, our critics happily believe that the criminals and hippies are typical of life in America. By overemphasizing our problems we have generated a national guilt complex, a depression of national spirit. After all, if you tell a person often enough he is sick, he actually can become sick.

It's time we challenge those critics who seek to destroy America rather than to rebuild it. We cannot afford to stand by idly while this small minority of irresponsible people brings shame and humiliation to our country. There is no doubt that some Americans have legitimate grievances, and it will be imperative that we correct any barriers to equal rights and opportunities. But this cannot be accomplished by shallow exaggerations or false promises. Nor will it be achieved through mob action.

Law and order is probably the most important issue of 1968. In the past eight years crime has outpaced population growth by almost nine to one. Last year there was a murder every 41 minutes, with crime costing more than $20 billion a year. Your chances of being murdered, maimed, or robbed will be one out of 70 in the next 12 months. Chances are one out of five that someone in your family will be the victim of a criminal this year, and one boy in six will get in trouble before he is 18. There are too many today who suggest that man can pick and choose among those laws he will obey. There are too many who believe that social reform is sufficient excuse to violate the rights of others. Some believe it is better to free 10,000 criminals than to convict one innocent man.

As a result, the confessed killer of a wife and four children is freed because his lawyer was not present to hear his confession. Another confessed murderer is released because the police held him a few hours before formally charging him the crime to which he had voluntarily confessed. We are told that poverty is a root of crime. Yet often that is not the case. In Detroit more than $175 million of anti-poverty funds had been spent just prior to the rioting there.

Poverty supposedly was the issue of Resurrection City, and yet nearly $2 million was squandered on that sorry mess. In Chicago riots earlier this year, the 1800 persons arrested were found to be carrying $85,000 in cash. One person had $563 in his possession. Poverty is a feeble excuse for outright lawlessness. A crime is a crime, and the only way to reduce this trend is to demand prompt apprehension, a prompt trial, and a substantial sentence commensurate with the crime committed.

It is my personal opinion that much of today's unrest can be attributed to the frustrations of those who have expected immediate results from the promises of others. Certainly no one objects to the goal of conquering poverty, but our leaders can be criticized for generating false hopes that the answer would come immediately. In recent months, we have found similar crises on the college campus. Too often, campus aggression has been met with appeasement. Too often, faculty members have hidden behind the facade of intellectual attainment and academic freedom to encourage lawless activities. Perhaps the voice of the student has not always been heard, but since when has it been his responsibility to run the campus?

Today the American student enjoys the finest educational opportunities ever offered at any time. For this privilege, he pays a tuition that doesn't even cover half the costs at most colleges. Certainly we have an obligation to preserve the right to dissent. But that does not include any special right to ignore the law. Some students today want freedom now, without restraint, without correction, without responsibility—and they will not wait any longer. We must challenge this attitude. Too many have been selling America short. Too many have forgotten all that is right about our country. Too many have lost faith in themselves and in the will of the people to build a better America.

We still remain the strongest and richest nation on earth. Go into the heart of our land, and you will find millions of church-goers, orderly students, conscientious parents, and promising families. You will find minority groups moving up the economic ladder at a speed undreamed of a few years ago. Barriers to jobs and education are crumbling everywhere. Illiteracy is at an all-time low and affluence at an all-time high. School and college enrollments are setting records. Wages are the highest in the world, and savings accounts are bulging.

For every one law breaker on the college campus, there are thousands of serious students. For every five who would desecrate the American Flag, there are five million who revere it. Certainly the United States has its weaknesses, but our strengths far outweigh any shortcomings. Probably no other country criticizes itself as frequently, or as publicly, as do we.

Americans may be worried and depressed, but nobody expects our government to topple or our way of life to collapse. Here at home, this ability to rebuild a better America may be taken for granted. But, in most countries, this flexibility to change without a total collapse of government is an unbelievable miracle. Americans are always seeking new and higher goals. As one plateau is reached, new pursuits of excellence are sought. Certainly we have proved that things could be done, that dreams could be embodied in action, that a better life in fact could be achieved—provided we were willing to work for it.

The United States has faced serious crises before. But we overcame them—not by convincing ourselves that we would fail, but rather by believing that we would win. Today, there are too many Americans who are convinced that we will fail. They throw up their hands in complete helplessness. But why should we be led by these prophets of despair or the peddlers of hate? Collectively, we all have been blamed for the senseless rioting and violence, but since when does one sick person make a sick society?

It's wrong to refer to all young people as the lost generation, just because a few of them commit crimes or take dope. It's also wrong to think that all Negroes are looters or rioters just because a small percentage of their group commits such crimes.

Sometimes Americans are strange people. They yell for the government to balance the budget but use their last dime for a down payment on a car. They whip enemy nations and then give them the shirt off their back. They know the batting average of every baseball player, but don't know one half the words in the Star Spangled Banner. They get mad at their wives for not running their home with the efficiency of a hotel, and they get made at the hotel for not operating like their home. They grow more food than any other country in the world, and have more diets to keep them from eating it.

Despite our idiosyncrasies, we still are proud of the person who sets out to do something and does it. We also respect the person who is constantly looking for more to do, and who isn't always rationalizing why he shouldn't do it. I see no reason why we should apologize for America's success just because we have a few shortcomings. Certainly we cannot be complacent about our country's faults, but neither should we be apologetic about its strengths. Frankly, it's time we had a little less pity for those who refuse to help themselves and a little more respect for the doer, for the achiever. Instead of emphasizing the sideline critic, let's encourage the responsible citizen. As we seek solutions to our domestic needs, we must develop meaningful national priorities. No nation, no matter how rich or powerful, can afford to go on year after year living beyond its means.

Such priorities will force curtailment of domestic spending. At home, we will have to turn to the private sector for leadership in such problem areas as job training, urban renewal and unemployment. After all, it is American business that built our cities, and there is no reason why American business cannot rebuild them.

Instead of degrading welfare, we must substitute the elements of hope and dignity that come to the man who has a steady job. Today, industry is creating an average of 5,000 new jobs per day. By 1975 America will need 14 million new workers. Of necessity, many such positions will be filled from the urban poor and the unemployed. Regrettably, nearly one million U.S. teenagers drop out of school each year. Many become doomed to careers of crime, alcohol and narcotics. Obviously, we cannot afford to remain indifferent to this national problem.

The establishment of national priorities also will force reappraisal of America's role as a world power. In the past 20 years, the United States has given nearly $130 billion in foreign aid, and yet even our allies delight in criticizing America. As we develop priorities in foreign aid, it would seem much more important to me that we be respected as a nation rather than win a popularity contest.

This is not to suggest that we can ignore our responsibilities such as those in Vietnam today. Ultimately this crisis is a challenge to America. It is a test of the enemy's conviction that the United States is over-committed and unwilling to draw the line. It is no accident that some of the most bitter fighting of the entire Vietnam war has occurred after the Paris talks began. Just recently we experienced the highest monthly casualty rate of the entire war. The Vietnam conflict is now the longest war ever fought by Americans. Communist aggression continues at record levels.

Certainly all Americans hope for a meaningful solution to the war, but we must remember that the Communists use the conference table as just another war front, particularly when they have lost on the battlefield. More than two-thirds of all Americans killed in Korea died after peace talks began. This past experience should tell us that there is little assurance that negotiations mean either peace or a satisfactory solution to the war. Ultimately, we can hope to achieve a lasting peace—not just for Vietnam, but of the entire Pacific area—when we convince the enemy that we will match words with deeds, that we do have the will to win, and that we do intend to remain a powerful and respected nation.

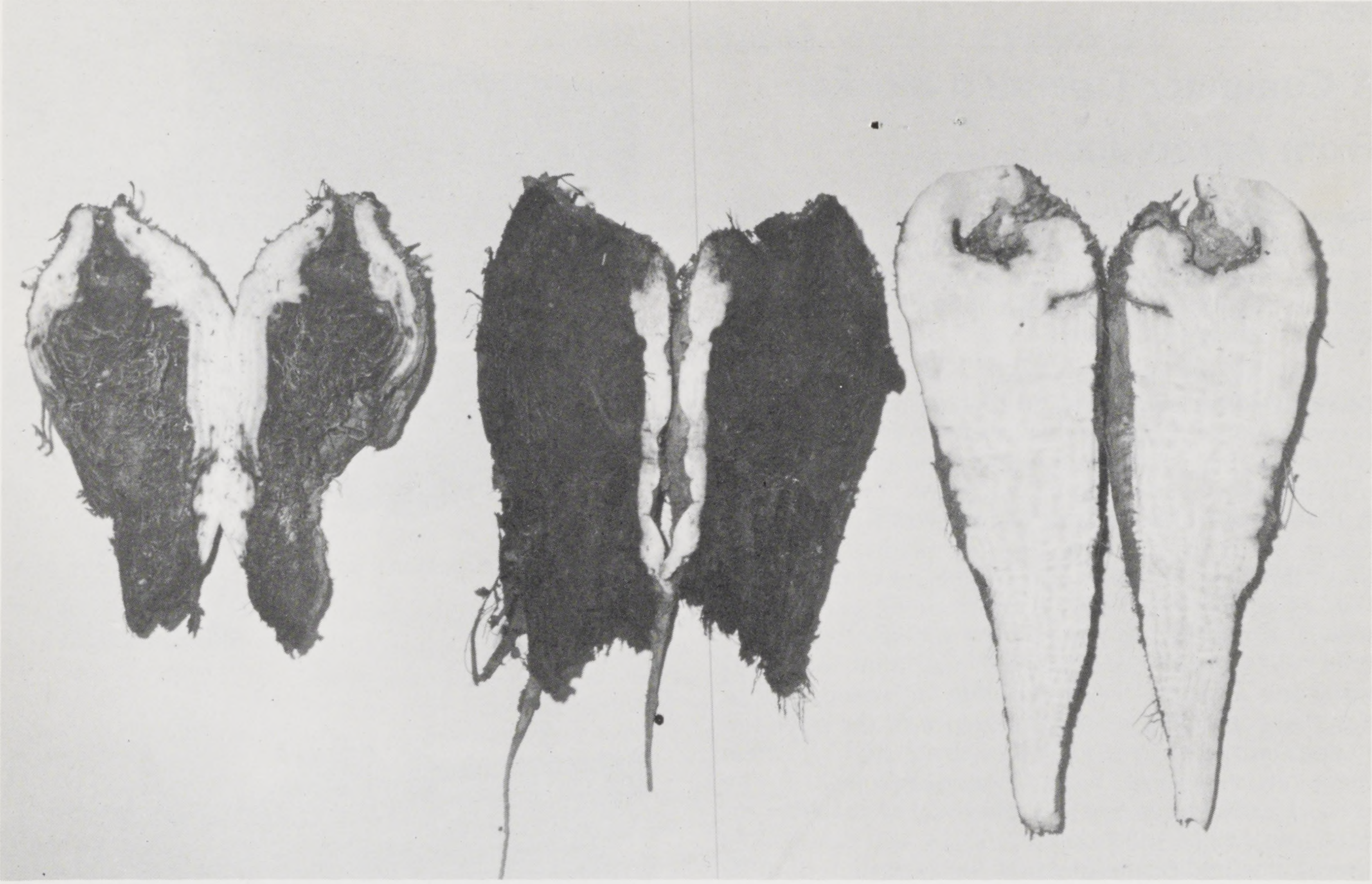
In conclusion let me say this. Sure, our problems are awesome indeed, but let's not forget that there is a massive will to preserve our precious American dream. Let's not forget that we still enjoy the most envied way of life ever known to man. Let's encourage our young people to seek the challenge of opportunity, rather than any false hope of security. Let's challenge the thought that the world owes anybody a living. I have little tolerance for those who thrive on self-pity, or who attempt to drop out of society in protest against problems they say they did not create.

Let's stop apologizing for our success. After all, it is the current adult generation that built the world's strongest economy out of the ashes of a major depression and two wars. Let's remember that a college education is a precious privilege, not a constitutional right. Those undergraduates who cannot give complete loyalty to the college they attend should leave and make room for others who would.

In addition, we must urge complete respect for law and order. Let's recognize that there are more who support the law than who deny it. Despite our crises at home and abroad, let's not be discouraged by failure. The history of our country is rich with individuals who used their own disappointments as stepping stones to achievement.

Remember that Lincoln's name is immortal today, not because he lived in that log cabin, but because he got out of it. Americans are proud of their concern for the underdog, but such generosity to the less fortunate is available only because someone else achieved, and this ability to help is possibly, not because of what anyone else did for us, but rather because of what we did for ourselves. All we have ever been able to provide is an equal place for everyone at life's starting line. But that is not to suggest that we can guarantee to anyone a victory, or even a tie, in life's race for achievement.

For many years, no one could run the mile in less than four minutes. Finally, Roger Bannister broke through that barrier. Since then, many others have duplicated or surpassed that record—simply because they believed it could be done. Americans have built the greatest nation on earth, simply because we, too, believed it could be done. In the future, an even better America can be created—provided we do not forget the Forgotten American.



These sugar beets were damaged by rhizoctonia, the two sugar beets on the left are advanced phases of the disease while the sugar beet on the right has only minor damage. This fungus disease is found in all agricultural soils and proper cultural practices are a must if damage is to be minimized.

High Quality Sugar Beets Are An Attainable Goal

By Frank R. Nelson

Mr. Nelson is a Field Superintendent in District III, Woodland. He formerly was a Field Superintendent in the Bakersfield area. This article is the result of a field survey of quality problems he conducted in Kern County this year.

An abundant supply of high quality sugar beets is a necessity for both processor and the grower. Quantity certainly has not been lacking this year as we are harvesting one of the finest crops on record. Quality, however, was again a problem in some of those areas which were harvested during the months of July and August.

A high quality sugar beet is generally defined as being low in nitrogen content, crisp, free of fibrous tissue and high in purity and sugar content. Of these characteristics sugar content and purity can probably be singled out as the most important. Sugar content of course is the percentage of sugar contained in the root. Beet purity is an expression of the level of impurities which exist in sugar beets. If the level of impurities is high it is difficult to extract the sugar contained in the roots cells and, conversely, if the level of impurities is low the sugar is extracted with relative ease.

The beet grower penalizes himself when substantial rot is present not only by lost tonnage but also by lower sucrose percent. Until several years ago the rot was removed from the beets caught in the sugar sample and then subtracted from the gross weight of the sample to arrive at the clean beet percentage. Now the rot is left on the beets and the sucrose test is made from the entire clean sample. Thus, one rotten beet in a sample can substantially reduce the sucrose percent of the entire sample. Many rotten beets completely decompose before harvest and are not picked up by the harvester and still more are pulled through the rolls on the machines or the screen at the receiving station. The grower loses the income from the decomposed beets directly but he also loses through a lower price

(Continued on page 36)

A Computer Operated Blocker From Agron, Inc.

Agron "Electro Blok" - This row crop thinner was designed to pick out wanted plants with any plant spacing desired, thereby assisting the farmer to achieve his plant reduction program and eliminate the high cost of hand labor.

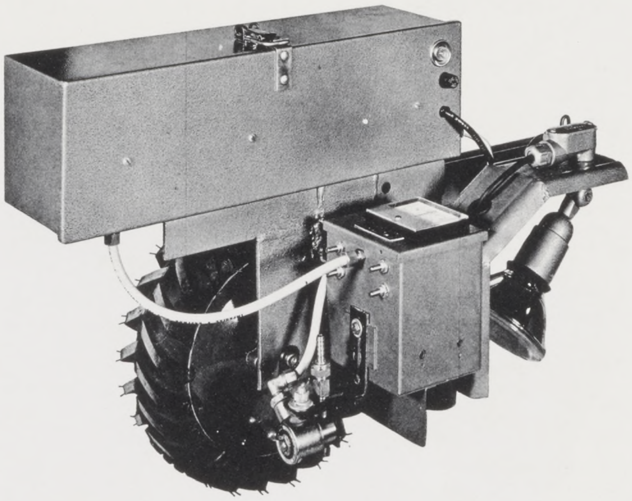
The "Electro Blok" is a small computer which can be set to select plant size and spacing between plants. It controls the "Eye" and "Solenoid". The "Solenoid" controls a spray that kills the unwanted plants. It shuts off while passing over the plant that the "Eye" selected. It then sprays and kills the plants and weeds in between the spacing selected for the plants. The "Eye" looks down at the plants and can be set to distinguish size of plants and not see most other grasses and weeds. If there is no plant in the pre-selected space, then the machine continues to spray until the "Eye" does see a plant. It will operate at speeds up to 4 m.p.h. depending on the experience of the operator. It does not have to touch the plants or have them break an electronic beam thus enabling it to be used at early stages of plant growth. The machine for each row weighs approximately 60 lbs. and can work in almost any field conditions with the exception of mud. Additional information may be obtained by writing, Agron, Inc., P.O. Box 650, Alberta Lea, Minnesota 56007.

Top Saver - New features on the 1968 Heath Beet Top Saver include longer topping knives to top even the biggest beets, stressproof shafting for greater strength and newly redesigned safety ratchet clutches with more adjustment for better machine protection. Other new features include standard pitch roller chain on all drives for extra strength and holes on pickup cams to allow dirt and trash to fall out and dissipate.

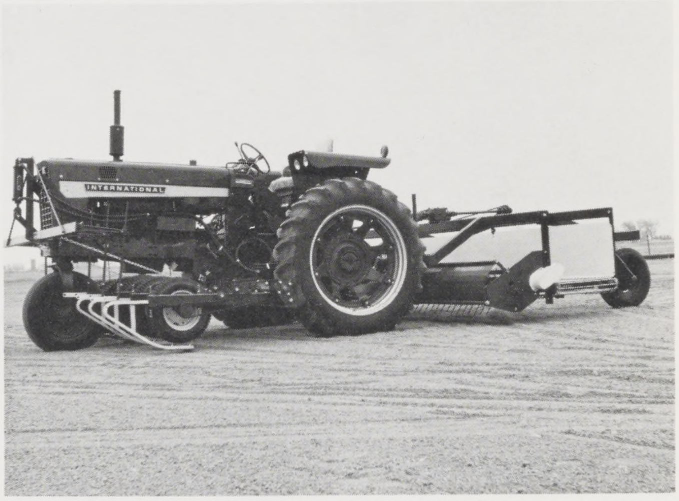
Heath Harvester - The new Heath "Rebel" Semi-Tank Beet Harvester combines the advantages of both a multi-row tank type harvester and a lifter-loader. Like a tank machine the "Rebel" has a hopper which holds up to 1,500 pounds of beets to eliminate waiting for trucks at row ends and make changing trucks on the go possible. The "Rebel" is similar to a lifter-loader because it costs less. It also weighs less and, therefore, requires less power.

Another feature of the Heath machine is the 32.5 square foot rienk bed—the largest in the harvesting business. A vertical scrubber chain is also used. Standard equipment includes a row finder and cleaning rolls are available as an option. The "Rebel" comes in three and four row models.

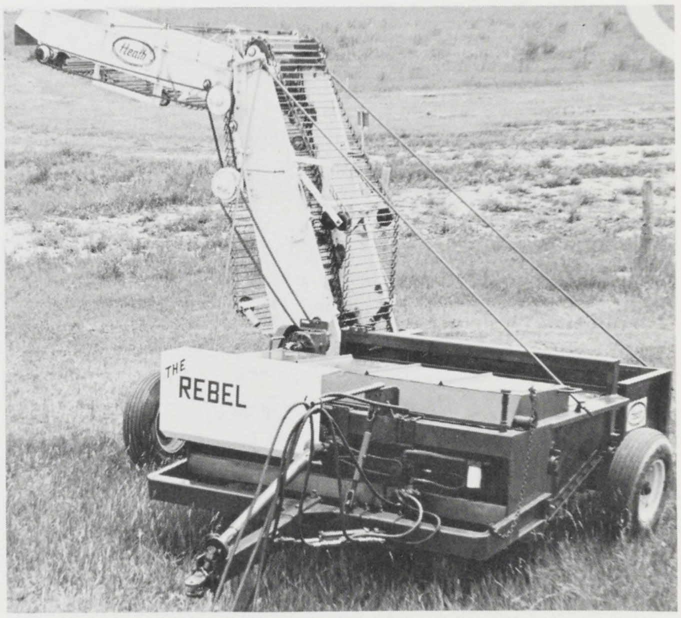
Both the harvester and top saver are manufactured and distributed by Product Engineering and Manufacturing Company, Inc., P.O. Box 312, Fort Collins, Colorado 80521.



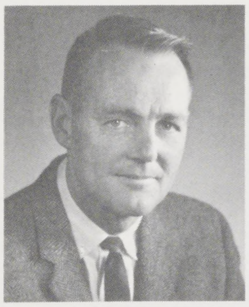
Computerized blocking has arrived with Agrons "Electro Blok".

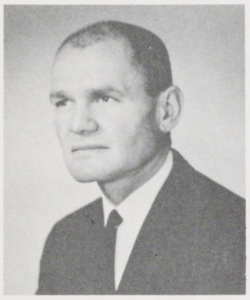


New Heath Beet Top Saver features longer topping knives.

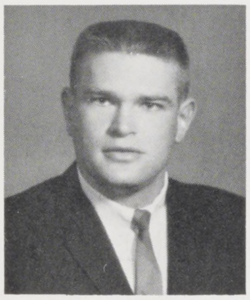


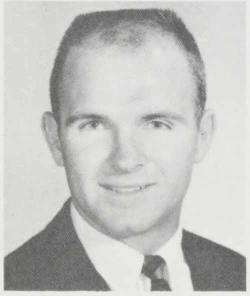
The new Heath "Rebel" combines the advantages of tank and lifter-loader type harvesters. The hopper holds 1,500 lbs. of beets.


Tom Ryan


Bob French

Morris Ball


Frank Hunt


Robert McGregor

AGRICULTURAL STAFF CHANGES

New Position For Tom Ryan

☐ Tom Ryan, formerly District Agricultural Engineer, Salinas has been promoted to the newly created position of Farm Properties Manager.

Mr. Ryan is a native of Sacramento, California. He attended the University of California at Davis where he majored in Agricultural Engineering. He joined Spreckels Sugar Company in 1951 at Sacramento where he served as an Assistant Field Superintendent. In 1952 he was transferred to the King City area and in the Fall of 1952 he was promoted to the position of Field Superintendent in the Hollister area. In 1953 he was transferred to Manteca where he served as Field Superintendent in the Tracy-Vernalis area and in 1957 he was promoted to the position of District Agricultural Engineer at Salinas.

Mr. Ryan, his wife Joann and six children, Tim, Janet, Pat, Michael, Matthew, and Mary Ann will remain in Salinas.

Bob French Joins Manteca Staff

☐ Bob French recently joined Spreckels Sugar Company's Agricultural Staff at Manteca as a Field Superintendent.

Mr. French is a native of Stockton, California and attended Washington State University where he majored in General Agriculture. He worked for Hunt Foods as Field Representative from 1946 to 1947. From 1947 through 1960 he operated a 2,000 acre diversified row crop farm in the Delta. In 1961 he joined the California Beet Growers Association as a Field Representative where he served until the present.

Mr. French, his wife Martha and three daughters reside in Stockton.

Morris Ball Transferred to Visalia

☐ Morris Ball, formerly Field Superintendent in the Arvin and Conner areas of the Bakersfield district has been transferred to Visalia, California in the same capacity. His new district encompasses the Goshen, Visalia and Stratford areas.

Mr. Ball joined Spreckels Sugar Company as an Assistant Field Superintendent in the Fall of 1963 at Woodland, California. He was promoted to the position of Field Superintendent in the Spring of 1964 and was transferred to the Bakersfield district in early 1965. He is a native of Williams, California and a graduate of Chico State College where he majored in Agronomy.

Mr. Ball, his wife Susan and son Scott, now reside in Visalia.

Frank Hunt Transferred to Bakersfield

☐ Frank Hunt has been promoted to the position of Field Superintendent and transferred to Bakersfield. He will replace Morris Ball as Field Superintendent in the Arvin and Conner areas.

Mr. Hunt joined Spreckels Sugar Company in March, 1968 as an Assistant Field Superintendent at Mendota where he worked with the research and field staffs. He is a native of Glendale, Arizona and attended the University of Arizona where he majored in Horticulture and received a degree in Agricultural Science. He served as a naval gunfire officer during a two year tour of duty with the Navy.

Mr. Hunt, his wife Mary and son Robert, now reside in Bakersfield.

Robert McGregor to Salinas

☐ Robert McGregor has been promoted to the position of District Agricultural Engineer and transferred to Salinas, California. He will fill the post vacated by Tom Ryan. He joined Spreckels Sugar Company in June, 1963 as an Assistant Agricultural Engineer in District IV, Mendota. His new responsibilities will basically entail the construction and maintenance of outside receiving stations in the Salinas and Imperial Valleys.

A native of Fillmore, California he attended the University of California at Davis where he majored in Agricultural Engineering. He is a member of the American Society of Agricultural Engineers and the Aircraft Owners and Pilots Association.

Mr. McGregor and his wife Lynette will reside in Salinas.

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HERBICIDE RESIDUES

(Continued from page 29)

rates, they may have some promise in monocotyledonous crops. Generally, they could not be used in crop rotation because of the severe symptoms in most crops from the use of dicamba, and the longer residual herbicide, picloram (the latter even at the rate of 1 lb per acre). Herbicides like FW-925, which are deactivated rather rapidly after being incorporated into the soil, represent a minimum residue problem.

HIGH QUALITY SUGAR BEETS

(Continued from page 33)

created by the partially decomposed beets which are delivered to the station and caught in the sample.

Kern County is an area in which a quality problem was encountered this year. A survey was conducted in the County to assess the problem and try to determine the causes in hopes of finding ways to remedy the situation in future years.

It was found that most of the rot was caused by Sclerotium rolfsii, Rhizoctonia (damping-off organism, common wet rot, and scalding. Soil type did not seem to make much difference because rotten beets were observed from the light soils in the Arvin area as well as the heavy soils of the Kern Lake and Buttonwillow areas.

Most of these rot problems can be minimized by some changes in cultural practices and field selection. Sclerotium rolfsii is by far the most serious of all the rots. It is a soil fungus that thrives only in moist soils and at moderate to high temperatures. Known Sclerotium fields should be avoided at all cost since a beet crop can become a total loss with a heavy infestation. Rhizoctonia, found as crown rot, tip rot and dry rot canker, is especially prevalent in fields with a history of heavy cotton or tomato cropping. Good crop rotation practices should help eliminate much of the Rhizoctonia and will reduce the Sclerotium problem.

Wet rot and scalded beets are a direct result of improper cultural practices. Standing water, flooded beds and irregular irrigation are the common causes. These problems should be eliminated in the ground preparation, bedding and planting stages. Avoid flooding the beds throughout the season. A slightly higher bed can help. The soil around the beet needs to be moistened not flooded. With the practice of using Treflan as a layby application many growers are neglecting the last cultivation. An additional late season cultivation can clean the furrows by removing dead leaves and trash which permits better water control and thus shortens the time required for the irrigation. Drains should be kept clean and over irrigation should be avoided. Maintain a good irrigation schedule and remember that frequent and light irrigations are better than the heavy saturating type when the temperatures are high. Once you have allowed your crop to stress for water the epidermal tissue begins to break down and soil organisms can enter the beet. When water is again applied and high temperatures are prevalent, the rate of decomposition is accelerated.

California Weed Conference To Be Held At Fresno

The 21st annual California Weed Conference will be held at the Hacienda Hotel, Fresno, California on January 20-22, 1969.

All of the preliminary plans for the conference have been made and a tentative schedule drawn up.

Every year this conference has found it necessary to broaden the range of information it must present due to the multitude of new compounds and new techniques that are offered each year. This years conference will have a variety of programs with portions designed to encourage grower participation.

SALINAS PUBLIC LIBRARY

SPRECKELS SUGAR BEET BULLETIN

PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

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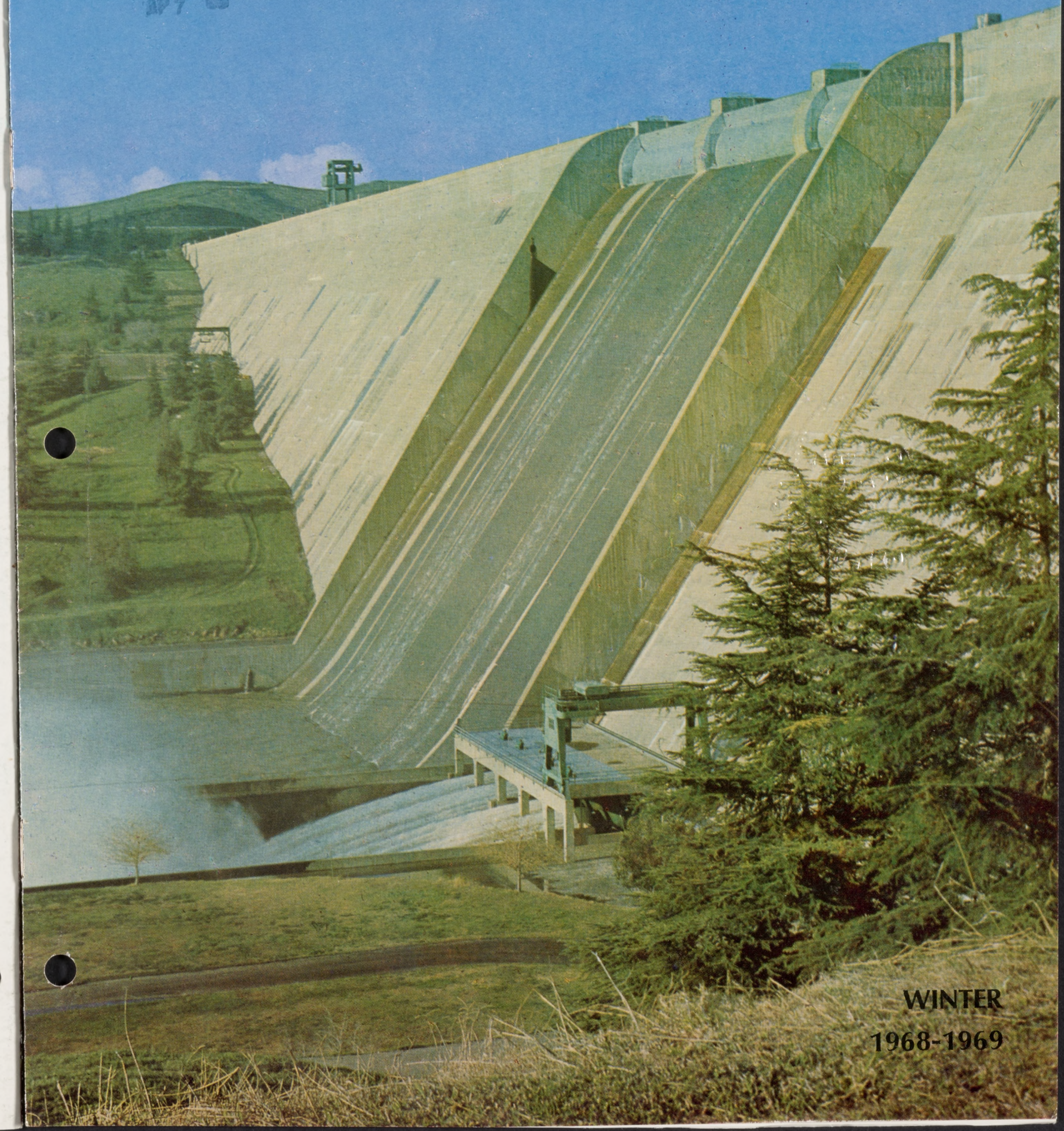


WINTER

1968-1969

General News and Comment

U.S. Farmland values rose 70% in the last decade according to the American Farm Bureau Federation. State averages ranged from 41% to 132% above 1957-1959 values. Strongest advances were in the South where values more than doubled in several states.

Increase for the year ending on March 1, 1968 was 6%. Farmers, who account for nearly 2 out of 3 buyers, bought land primarily for enlargement.

Trend toward larger farms continues unabated. Rapid advances in technological developments has made it not only possible for farms to become larger but often necessary in order to maintain income. Total number of farms declined about 15% between 1959 and 1964, but farms with annual sales of more than $20,000 increased 29%.

The number of large scale farms (annual sales over $100,000) increased 57% between 1959 and 1964. They only accounted for 1.4% of all commercial farms but they accounted for approximately one fourth of the value of all farm products sold from commercial farms in 1964.

Corporate farms are predominantly family owned and they tend to be in the top size and sales brackets according to a recent U.S.D.A. survey. Reasons for incorporation include: (1) owners may be liable for a smaller personal loss than other proprieters would be in case of a business failure, (2) corporations, unlike other businesses, can raise equity capital outside the firm which is important to the growth of a large scale farm firm, (3) incorporating softens the impact of inheritance taxes on family members when the farm owner dies and also provides a legal basis for continuing the business, and (4) incorporation has been encouraged by a 1958 Federal tax rule, which extends the advantages of general corporations to family businesses which incorporate with no more than 10 stockholders.

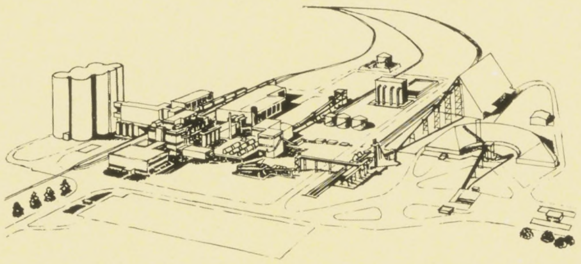
Farm production in California was a record 40.2 million tons in 1968 according to State Director of Agriculture, Richard Lyng. This represents a 4 percent increase from the previous record harvest of 38.8 million tons in 1964 and is 13 percent higher than last year's output of 35.5 million tons.

Total production for vegetable crops was the largest in the state's history and field crop production was second only to the 1964 harvest.

Sugar Beets made a sizeable contribution to the new record with total production just short of 6 million tons, up one-half from the 1964 million ton crop of 1967. The increase in total tonnage is due to increased acreage and an estimated 23.5 tons per acre average yield which is the highest since 1959.

SPRECKELS SUGAR BEET BULLETIN
PUBLISHED FOR CALIFORNIA SUGAR BEET GROWERS BY THE SPRECKELS SUGAR COMPANY

VOL. 32 *WINTER, 1968-1969* *NO. 4*



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Spreckels Sugar Beet Bulletin is published quarterly by the Agricultural Department of Spreckels Sugar Company as a service to its growers. Mention of specific methods, devices and implements does not constitute an endorsement by the Company. Please address all communications to: Spreckels Sugar Beet Bulletin, P.O. Box 325, Mendota, California 93640. Please include your zip code.

Cover Comment: Friant Dam, hub of the Friant Division of the Central Valley Project, spans the canyon of the San Joaquin River 25 miles northeast of Fresno where this great river leaves its deep gorges of the Sierra Nevada and enters the valley floor. The concrete dam was completed in 1944, is 319 feet high and two-thirds of a mile long. Millerton Lake, behind Friant Dam, has a capacity of 520,500 ac. ft. Controlled releases of water through the Friant facility help supply sugar beet growing areas in Madera and Kern Counties. The dam's river outlets are shown releasing 8,000 cubic feet of water per second.

Fertilize Crop -- Not Crop Residue

Reprinted from "California Agriculture"

"California Agriculture" is published by the University of California, Division of Agricultural Sciences. The study was made by B. A. Krantz, Extension Soils Specialist; F. E. Broadbent, Professor of Soil Microbiology, Department of Soils and Plant Nutrition; W. A. Williams, Professor of Agronomy; and K. H. Ingebretsen, Extension Technologist, University of California, Davis, and K. G. Baghott and M. E. Stanley, Farm Advisors, Modoc-Siskiyou Counties and Monterey County, respectively.

Nitrogen and other deficient nutrients should be applied at the time, placement, and rate most beneficial to the crop. Some agriculturists have recently promoted the idea of fertilizing residues to promote rapid decomposition and store up a "bank account of nitrogen in the soil" There is considerable difference of opinion on the efficiency, effectiveness, and wisdom of residue fertilization. In cold climates, as in northern United States, fall fertilization with ammonium nitrogen for spring crops is an ideal practice. However, the situation is far different in the irrigated lands of California where the winter soil temperature is above 45°F, and nitrification of ammonium fertilizer takes place at an appreciable rate in a moist soil. Winter rains expose these nitrates to loss by leaching in sandy soils or denitrification by temporary waterlogging in clay soils. This report summarizes field experiments and greenhouse tests in California on the nature of nitrogen transformations.

SUGAR BEETS

An experiment was initiated in 1964 to compare the effectiveness of nitrogen applied to barley residues in the fall with nitrogen applied as a side-dressing to the succeeding sugar beet crop. Results (see table 1) indicate a marked response was obtained from nitrogen fertilizer side-dressed to the sugar beet crop. No increase in sugar yield was obtained from 30-, 60-, or 120-lb. per-acre applications of nitrogen applied to the barley residue the previous fall. It is likely that the fall-applied nitrogen was leached below the root zone by winter rains in this permeable Yolo loam soil. The yield reduction from fertilizing residues with 120 lbs.N in the fall, compared with side-dressing 100 lbs.N on the beets in the spring, was 3270 lbs. of sugar per acre. At $4 per cwt. this meant a loss of $130.80 per acre.

BARLEY

In a large scale field experiment in Tulelake, fall application of 84 lbs.N per acre as ammonium sulfate was made just prior to plowing. This was compared with the same amount of ammonium sulfate applied at barley planting time the following spring. The yields from these two treatments were: (1) 84 lbs.N applied on barley residues in the fall, 3346 lbs. per acre; (2) 84 lbs.N applied at barley planting time in spring, 4209 lbs. per acre (least significant difference .05, 431 lbs.)

The yield reduction from fertilizing the residues in the fall, compared with fertilizing the barley in the spring, was 863 lbs. per acre. At $2 per cwt, this means a loss of $17.26 per acre. This indicates that even under the relatively cool conditions which occur in the Tulelake area, much of the fall-applied ammonium nitrogen was either nitrified and lost or immobilized and unavailable to the succeeding barley crop.

In Monterey County, liquid ammonium nitrate was sprayed on barley stubble in late February just prior to plowing for "fallow" and compared with dry ammonium nitrate broadcast in late October just prior to seeding barley. The experiment was conducted under rain-fed (dryland) conditions with nitrogen applied at the rate of 40 lbs. per acre. Control plots receiving no nitrogen averaged 2199 lbs. per acre. The fall application of nitrogen gave a significant yield increase of 350 lbs. per acre. The late February application on the stubble gave only a 212-lb. increase which was not significant. Again, fertilizing the residue tended to be less efficient than fertilizing the crop at planting time.

SAFFLOWER

In the Sacramento Valley much of the safflower is grown on heavy rice soils, and, for convenience, some growers have applied nitrogen in the late fall. To evaluate the effectiveness of fall vs. spring application, trials were established on Sacramento clay soils in Colusa County in 1960 and 1961. The results (table 2) indicate that spring applications were significantly better than fall applications for both years. On the average, the spring application yielded 478 lbs. more safflower than the fall application. At $4 per cwt, this means a loss of $19.12 per acre from fall application. In 1960 aqua ammonia was injected at 6 inch depths, and in 1961 urea was broadcast and disced in. The rainfall between time of fall application and spring application was 9.4 inches in 1960 and 5.8 inches in 1961. The exact reason for the reduced effectiveness of the fall application is not known. It is probable that much of the ammoniacal nitrogen applied in December was nitrified, and subsequently denitrified during periods of temporary waterlogging in the winter season.

The results from these five experiments indicate that applying nitrogen to the crop is far more efficient and effective than applying nitrogen to previous crop residues months ahead of planting the crop.

WATER INFILTRATION

One of the important reasons for incorporating residues in soils in irrigated agriculture is the possible beneficial effect upon water infiltration. This is particularly true in fine textured soils where water intake is slow. In a series of studies involving the application of nitrogen on residues, it was found that the beneficial effect of residues on infiltration was reduced by nitrogen application to the residues. It is believed that this is due to the more rapid decomposition of the residues with nitrogen application.

In one of these trials, barley crop residue was incorporated and irrigated both with and without 120 lbs.N per acre on August 23. Furrow infiltration measurements from mid-September through mid-July showed consistent decrease in infiltration during this period. The mean infiltration rate in the residue plot was 1.57 inches per hour. In the residue-plus 120-lbs.N plot, the rate was only 1.31 inches per hour, which was a significant reduction. All residue treatments were significantly better than the fallow plot.

Earlier studies also showed that high nitrogen materials such as legumes and mustard green manure were less effective than low nitrogen residues such as corn stover, barley straw, and grasses. In fact there was an inverse relationship between the nitrogen content of the residue and the effectiveness of the residue in improving infiltration in the succeeding crop.

These data appear to be at variance with the time-honored data of past decades which showed that high nitrogen organic matter from legumes was much more beneficial than low nitrogen residues from grass-type plants. However, in these cases the succeeding crops were not fertilized with sufficient chemical nitrogen and the main effect of the legumes was to contribute nitrogen to the succeeding crop. With the availability of low cost chemical nitrogen and the know-how for application to the succeeding crop, attention is now being focused on making the most effective use of previous crop residues for the improvement of water infiltration and other physical properties. Once again, it appears that it is better to let the previous crop residues decompose slowly without fertilization - and then to provide adequate fertilization for the crop at the best time and using the most desirable method.

NITROGEN IMMOBILIZATION

When nitrogen fertilizers are applied to soil, a group of processes are set into motion which utilize inorganic nitrogen and compete with the crop for the fertilizer. Until recently, it was difficult to study these processes since one could not distinguish added fertilizer nitrogen from soil nitrogen. However, a distinction can be made by labeling the nitrogen fertilizer with the isotope N^{15}. Since this isotope is stable, it can be used to study the fate of nitrogen fertilizers in long-term experiments.

Biological immobilization is one process which competes with the crop for added nitrogen fertilizers. Microorganisms in the soil require nitrogen for growth and reproduction just as do higher plants. If conditions favor rapid development of the soil micropopulation, a considerable quantity of fertilizer nitrogen may be incorporated into microbial cells. One such condition is the presence of readily decomposable crop residues. It is well known that with the incorporation of carbonaceous crop residues, nitrogen deficiency of the succeeding crop may result unless fertilizer is supplied for the crop.

It has been commonly assumed that nitrogen immobilized by the soil micro-organisms is tied up only temporarily and that this will be released again within a matter of weeks or months as the microbial cells undergo decay. This assumption was tested in an experiment with Montezuma clay and Yolo fine sandy loam. Both soils received additions of tagged ammonium sulfate equivalent to 50 ppm N in the presence (and absence) of 1 percent barley straw. The soils were then cropped to sudangrass in the greenhouse over a period of 596 days - during which time eight cuttings were harvested. The graph shows the cumulative plant uptake of fertilizer N and of fertilizer plus soil N in Montezuma clay. Most of the fertilizer nitrogen was taken up in the first crop with little change thereafter. There is no indication of rapid turnover of the fertilizer nitrogen immobilized in the presence of the straw. There was some increase in release of soil nitrogen in the presence of fertilizer, as shown in the bottom half of the graph, but the trend of the curves suggests that many years will be required before fertilizer recovery from the straw treatment finally equals that from the treatment without straw.

In a similar experiment with Columbia fine sandy loam, calcium nitrate was used as the fertilizer to avoid the complication of ammonium fixation. Nitrogen uptake by a succession of seven cuttings of sudangrass, grown over a period of nearly two years, is shown in table 3.

Where straw residue was applied, nearly three-fourths of the feritlizer nitrogen remained in the soil at the end of the experiment. Even without the addition of straw more than one-fifth of the fertilizer remained in the soil. It is also interesting to note that the bulk of the nitrogen in either case was absorbed by the first crop. The second crop absorbed only 5 to 6 percent, and very little nitrogen was released thereafter. These results suggest that nitrogen immobilized in the decomposition of carbonaceous crop residues becomes progressively less available as time goes on and may not be mineralized for many years.

HANDLING CROP RESIDUES

One of the main problems with crop residues is the possible interference with tillage, fertilizer injections, or planting. One of the best ways to avoid these problems is to use stalk shredders and early in-

TABLE 1. SUGAR YIELDS AS INFLUENCED BY FALL NITROGEN APPLICATION ON BARLEY RESIDUE VS. DIRECT NITROGEN APPLICATION TO SUCCEEDING SUGAR BEET CROP ON A YOLO LOAM SOIL AT UC, DAVIS

Nitrogen applied to residues	Pounds per acre of N applied as side-dressing on beets				
	0	50	100	150	200
Lbs/A	Sugar yield in cwt per acre				
0	55.7	74.9	90.6	91.9	93.7
30	53.7	72.9	87.6	89.9	89.8
60	56.5	69.9	86.2	92.3	93.2
120	57.9	79.2	90.5	87.7	90.2

LSD (.05) between nitrogen side-dressing, means = 8.6 cwt.

Amount of barley crop residue: 5860 lbs. per acre containing 0.25% N.

Nitrogen source: ammonium nitrate.

Fall nitrogen application to barley crop residues: Nov. 24, 1964.

Nitrogen side-dressing to succeeding sugar beet crop: June 9, 1965.

corporation of the residue to start the decomposition process. If this is done immediately after a timely harvest, there is usually sufficient soil moisture to start decomposition. Under normal practices, these partially decomposed, finely chopped residues will not interfere seriously with the planting operation. The fine shredding and early incorporation may also be helpful in certain insect and disease problems. If the succeeding crop is to be planted shortly after residue incorporation, nitrogen should be applied in a preplant treatment or in a starter fertilizer to provide ample nutrients for the crop, particularly during the seeding stage.

Where very large amounts of residues are present, or certain insect problems exist, it may be desirable to apply nitrogen to promote more rapid decomposition, but such an application should not be regarded as contributing materially to the nitrogen requirements of the crop.

SUMMARY

1. Results of field experiments indicate that it is more efficient and effective to apply nitrogen to the crop than to previous crop residues months ahead of planting the crop.

2. The increase in water infiltration rate resulting from various green manures or crop residues was inversely related to the nitrogen content at the time of incorporation. Low nitrogen residues had a longer lasting effect than legumes or other high nitrogen residues.

3. The beneficial effect of barley crop residues on infiltration was significantly reduced by nitrogen application to the residue.

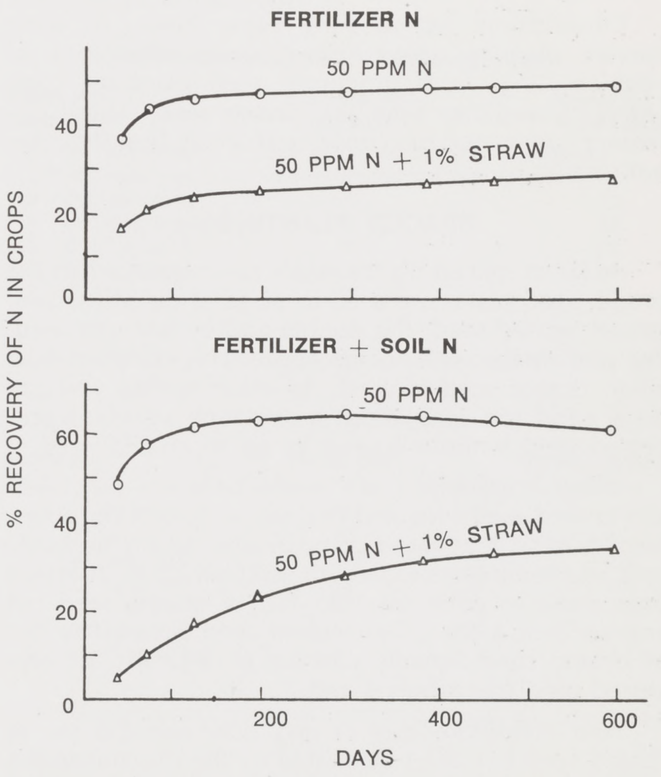
(Continued on page 48)

TABLE 2. FALL VS. SPRING NITROGEN APPLICATION — COLUSA COUNTY 1960 AND 1961

Nitrogen rate	Date applied	Yield		Average of 1960 & 1961	
		1960	1961	Yield	Increase due to N
Lbs/A		Pounds per acre			
0		1312	1447	1380	
100	December	2064	2060	2062	682
100	March	2453	2627	2540	1160
L.S.D. (.05)		242	249		

TABLE 3. PERCENTAGE OF UPTAKE OF FERTILIZER N BY SEVEN CUTTINGS OF SUDANGRASS

Crop	Percentage of added fertilizer N	
	No residue	2% straw
1	52.4	10.9
2	6.7	5.2
3	1.4	2.5
4	0.6	1.4
5	0.4	1.4
6	0.2	0.7
7	0.1	0.9
Total	61.8	23.0
Roots	12.8	4.9
Remaining in soil	22.8	72.0
Lost	2.6	0.1



Uptake of fertilizer and soil N by eight cuttings of sudangrass on Montezuma clay.

Points to Consider Before Planting Coated Seed

By George Wheatley

Mr. Wheatley is an Agronomist for Spreckels Sugar Company at Salinas, California. His primary responsibility is the production, processing, and distribution of Spreckels Sugar Company's commercial beet seed.

A popular misconception exists that in order to obtain better emergence and precision plant one has to use coated seed. Such is not the case though since many comparisons made in experimental and commercial plantings between standard processed and coated seed have consistently shown that processed seed has emerged at least equal to and up to 44 percent better in comparable plantings. A consistent 10-20 percent increase in emergence percentage is obtained from processed seed over coated seed plantings.

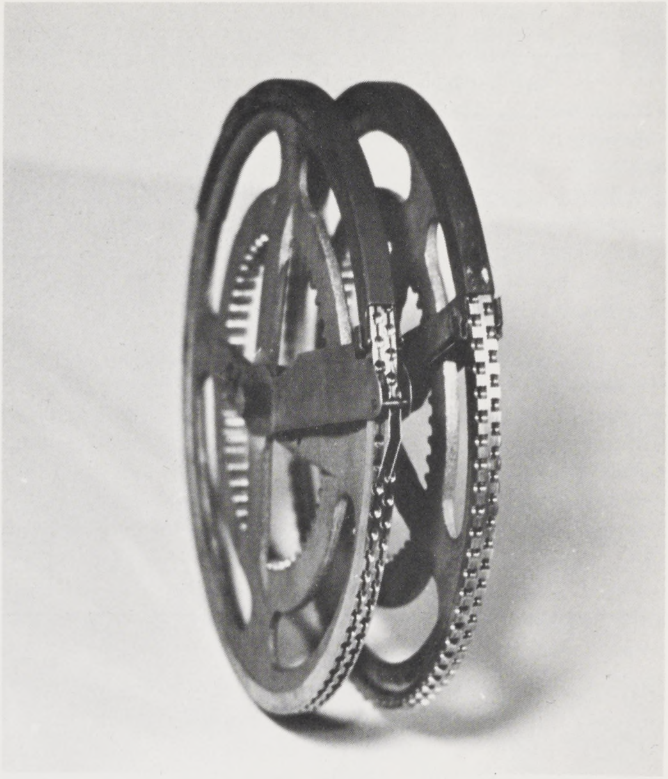
Observations on seedling sugar beets, in comparable plantings, have shown faster emergence of beet seedlings from processed seed plantings compared to seedlings from the coated seed. These differences may not be considered great but they are noticeable.

SPACED PLANTINGS

As far as spaced plantings are concerned, when the proper seed plates are used to plant or distribute processed treated seed, the double and/or multiple seedling percentages will not be appreciably different than when coated seed is used. In other words, you can do a good job of space planting with standard processed seed without having to go to coated seed.

When comparison are made between processed and coated seed for stand evaluation or cost purposes, bear in mind that these comparisons should be made on a one to one or seedball to seedball basis. It makes little sense to compare 10½ lbs. of coated seed per acre to 3 or 4 lbs. of processed seed since 10½ lbs. of coated seed actually consists of 2.22 lbs. of processed seed (see tables 1 and 2).

Your conditions may or may not favor the use of coated seed but don't be misled by the misconception that you have to use coated seed to obtain better emergence and a precise job of planting.



MILTON PLANTER WHEEL. Pictured above on the left is the new seed wheel and ejector. On the right is the old wheel. Note the seed cells machined into the center of the new wheel's surface. The new wheel and ejector eliminate hopper and wheel wear and simplify planter adjustments.

TABLE 1. PROCESSED VS. COATED SEED

30 inch single rows

Seed Spacing (″)	Seeds per Acre	Lbs. 8-9½/64″ Seed/Ac.	Cost/Ac. Proc. @ 1.25/lb.	Lb. Coated Seed per Acre	Cost/A. Coated @ .50/lb.	Diff. Cost per/A.
2	104,538	2.22	$2.78	10.53	$5.27	$2.49
3	69,692	1.48	1.85	7.02	3.51	1.66
4	52,269	1.11	1.39	5.79	2.90	1.51
5	41,817	0.89	1.11	4.21	2.11	1.00

8-9½ = 47,000/lb. coated = 9933/lb.

TABLE 2. PROCESSED VS. COATED SEED

Two rows on 40 inch beds

Seed Spacing (″)	Seeds per Acre	Lbs. 8-9½/64″ Seed/Ac.	Cost/Ac. Proc. @ 1.25/lb.	Lb. Coated Seed per Acre	Cost/A. Coated @ .50/lb.	Diff. Cost per/A.
2	156,402	3.33	$4.17	15.75	$7.88	$3.71
3	104,544	2.22	2.78	10.53	5.27	2.49
4	78,402	1.67	2.09	7.89	3.95	1.86
5	62,726	1.34	1.68	6.32	3.16	1.48

8-9½ = 47,000/lb. coated = 9933/lb.

PLANTERS

PLANTER PLATES FOR PRECISION PLANTING SPRECKELS' PROCESSED, TREATED SUGAR BEET SEED

(Monogerm sized 8/64″ to 9½/64″ in diameter)

JOHN DEERE 70 & 71 FLEXI PLANTERS (72 cell/plate)

Plate No.	Plate Thickness	Cell Sz.	Approx. % cell fill
B12733B	0.125″=8/64″	11/64 inch	105-108
B13931B	0.105″=6¾/64″	11/64 inch	98-102
B14016B	0.105″=6¾/64″	10½/64 inch	98-102

INTERNATIONAL 185 PLANTER (82 cell/plate)

Plate No.	Plate Thickness	Cell Sz.	Approx. % cell fill
3639A	0.125″ 8/64 inch	11/64 inch	105-108
469283R1	7/64 inch	11/64 inch	98-102
463429R1	7/64 inch	10½/64 inch	98-102

STANHAY PLANTERS

Seed belt cell size 12½/64 inches in diameter will give 96 or 97 percent cell fill.

Seed belt cell size 13/64 inches in diameter will give approximately 104 or 105 percent cell fill.

JOHN DEERE 33 VEGETABLE PLANTER

Plate No.	Cells
B28038	54
B31030 (newest plate)	54

MILTON PLANTER

Plate Size	Approx. %
10-8½-8½ (old type seed wheel pre-'68)	105
12-8 (new seed wheel, 1968)	98-102

OTHER PLANTERS can be used to precision plant sugar beet seed. Spreckels' monogerm seed is sized 8/64 to 9½/64 inches in diameter and should be planted with seed plate cell openings between 10½/64 and 11/64 inches in diameter. Seed plates 6¾/64 to 8/64 inches in thickness are satisfactory because the monogerm seed is elliptical in shape. Seed plates and seed spacing should be decided upon by the grower after consulting with his field superintendent.

SOME POPULAR SUGAR BEET SEEDLING RATES, IN SEEDS PER FOOT, ARE SHOWN BELOW WITH PLANTER SETTINGS TO OBTAIN THESE SPACINGS*

JOHN DEERE 70 & 71 FLEXI PLANTERS (72 cells)

Seeds Per Foot	Sprocket on Drive Axle	Sprocket on Feed Shaft
2 (6″ spacing)	use extended drilling attachment	
2.4 (5″ spacing)	use extended drilling attachment	
3 (4″ spacing)	9	22
4 (3″ spacing)	11	20
5 (2.4″ spacing)	14	20
6 (2″ spacing)	9	11
8 (1½″ spacing)	22	20

MILTON PLANTERS

Seeds Per Foot	Seed Cell Wheel	Gear Drive
2 (6″ spacing)	70 cells	7 tooth
2.4 (5″ spacing)	70 cells	6 tooth
3 (4″ spacing)	70 cells	9 tooth
4 (3″ spacing)	70 cells	12 tooth
5 (2.4″ spacing)	160 cells	6 tooth
6 (2″ spacing)	160 cells	8 tooth
8 (1½″ spacing)	160 cells	10 tooth

WATCH YOUR SPEED!

You may be losing the benefits of precision planting.

INTERNATIONAL 185 PLANTER (82 cells)

Seeds Per Foot	Sprocket on Drive Axle	Sprocket on Feed Shaft
2 (6″ spacing)	use extended drilling attachment	
2.4 (5″ spacing)	use extended drilling attachment	
3 (4″ spacing)	9	22
4 (3″ spacing)	11	20
5 (2.4″ spacing)	14	20
6 (2″ spacing)	9	11
8 (1½″ spacing)	22	20

STANHAY PLANTERS

Seeds per Foot	No. of Belt Holes	Pulley	Planting Speed (mph)
2.4 (5″ spacing)	36	D	4
2 (6″ spacing)	30	D	4
3 (4″ spacing)	28	B	2½
4 (3″ spacing)	36	B	2½
5 (2.4″ spacing)	48	B	2½
6 (2″ spacing)	56	B	2½
8 (1½″ spacing)	60	A	2

***FOR OTHER PLANTERS** — Comparable settings should be determined and utilized in planting.

John Deere Features New Harvester and Electronic Thinners

The John Deere Company recently revealed the new John Deere 231 Sugar Beet Tank-Type Harvester and the 100-K Series Synchronous Thinners.

The new 231 harvester which replaces the 223 beet harvester will dig two rows spaced 22 through 40 inches, three rows spaced 22 through 24 inches and two rows on a bed spaced 14 inches and over. The power train is a PTO driven unit and will handle both 540 rpm and 1000 rpm tractor PTO's.

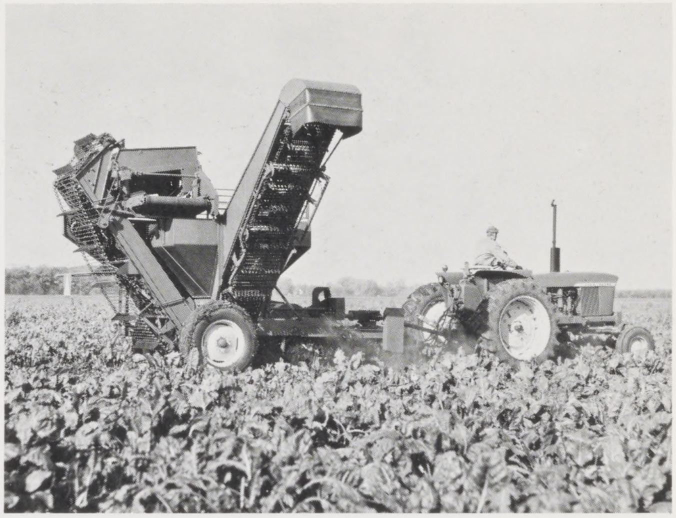
The rienk screen is a bed of six rolls on which the offset rienk spiders are loosely mounted. The loose mounting lets the spiders wobble to provide a self-cleaning action and help prevent clogging. The sides of the enclosed bed are steel rods so that trash, dirt, and mud are eliminated from the sides as well as the bottom. The rienk bed gives 16½ square feet of cleaning area and is protected by a slip clutch drive.

The tank has a capacity of 7,500 pounds and features a plywood lining on the side where beets drop to absorb the shock of the falling beets. The elevator is engineered to accommodate high truck sides and folds down for transport or storage. Optional equipment includes a big six roll grab roll screen with 14 square feet of cleaning area, a new finder unit and a topping unit which clamps on the front of the depth frame.

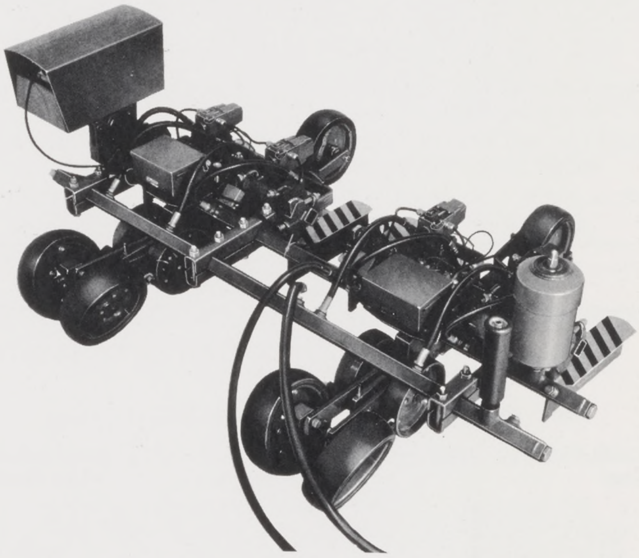
The John Deere Company calls its new thinner an electronic synchronous thinner. It's electronic because thinning action starts when an electronic probe touches a plant that should remain. It's synchronous because it's thinning pattern is synchronized with the germination pattern within the row.

All models of the thinner work at a down-the-row speed of approximately 1½ miles an hour and can thin in the neighborhood of 20 acres per day. Depending on such variables as the speed of individual field laborers, John Deere engineers have estimated that one six row thinner can replace as many as twenty men with short-handled hoes.

Advance planning and field work is a necessity for efficient operation of the thinner. Bed surfaces should be firm and smooth as possible to maintain uniform height of the electrical sensing device (see illustration page 45). The plant line should be free of clods as a clod can trigger the sensing device and activate the thinner. Plant spacing is also important. The plants should be spaced at least 2 inches apart. If the plants are too close, the machine will consider two plants as one and save both plants. For the most accurate work the plants should be from 1½ inches to 4 inches high and the plant lines free of weeds.



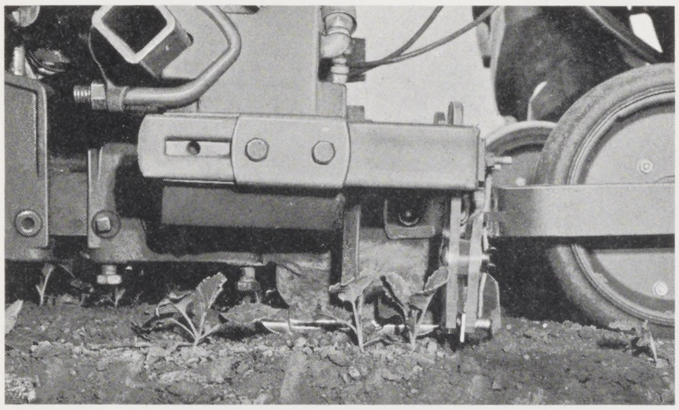
John Deere's new 231 tank-type sugar beet harvester features a big six roll grab screen with 14 square feet of cleaning area.



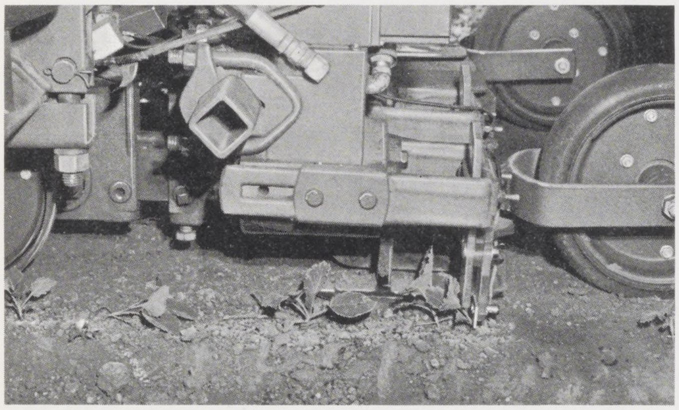
This is John Deere's new electronic synchronous thinning unit.

John Deere's thinner is available for single and double row beds.

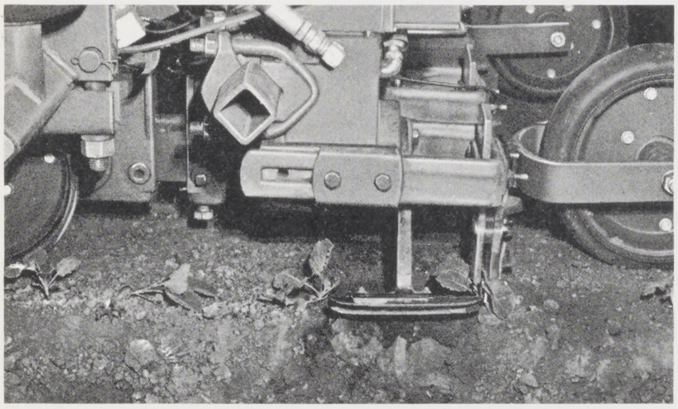
HERE'S HOW IT WORKS!



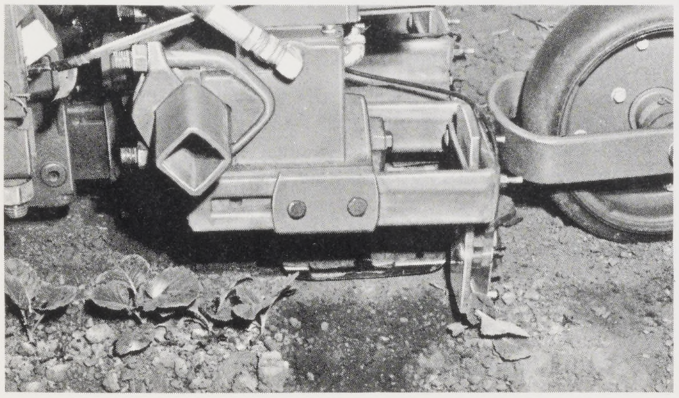
100K Series Thinner row unit (shown moving left in picture) as it approaches plant. The operating cycle begins when a plexiglass shield on the probe touches the outer edge of a leaf. The shield folds the leaves forward until the probe is over the center of the plant. This prevents leaves from contacting the electronic probe, which would activate the knife too soon.



As the unit continues to move along the row, and the shield folds the leaves forward, the electronic probe touches the plant near the plant's center. Contact with the plant completes an electric circuit, and generates a signal to a solenoid valve. The valve directs hydraulic oil to activate a piston which, in turn, moves the knife.



Activated by the signal from the probe, the knife swings across the row at extremely high speed. (From the time the probe touches the plant until the knife completes its swing time lapse is only 28/1,000 second). This speed provides plenty of force to knock out excess plants and weeds, for a distance equal to the length of the knife.



At the end of the swing across the row in one direction, the knife and knife arm stop. When the shield and probe contact the next plant, the same electrical and hydraulic actions take place, and the knife swings back to the opposite side, again clearing out excess plants and weeds. As the process is repeated down the row, a stand of young plants, properly spaced for maximum growth, is left to mature into a profitable crop.

The Use Of Anti-Crustants

By Harold Voth and Lee Seda

Harold Voth and Lee Seda are Field Superintendents in the Salinas and Woodland Districts respectively.

Because of the relatively high costs of hand labor in the Salinas Valley it has become necessary to radically change planting procedures from one where a generous amount of seed was planted to now what is considered a bare minimum of seed and in some cases, "planting to a stand".

To do this effectively it has been necessary to utilize materials which would effectively reduce the amount of crusting ordinarily experienced with soil types in this area.

This situation applies not only to the planting of sugar beets but other crops grown here such as lettuce, celery, broccoli, and tomatoes, all of which are of great economic importance in this highly productive area.

Several materials are being used to accomplish this, notably the following:

(1) Phosphoric acid applied at 70 gals. of 20% acid solution at a cost varying from $10 to $15 per applied acre. It is sprayed in a 3 inch band over the soil covering the seed immediately after planting.

(2) Sulphuric acid, 100 gals. of 10-12% acid solution per acre at a cost of $15 per acre. Exceedingly difficult material to handle except by experts and has proven injurious to the young seedlings in the germinating stage.

(3) Petroleum mulch, 50 gals. per acre. Somewhat more expensive than the acid treatments, but very effective during the cold winter season because of its warming effect.

(4) Spot spraying with a combination of vermiculite and petroleum at a cost of $20 per applied acre.

Phosphoric acid has proven to be the most popular material used because (1) it is the most effective anti-crustant; (2) most reasonable in cost; (3) easiest to apply. Growers can apply it themselves at a low cost of $8 per acre; (4) has an additional nutritive effect on the form of phosphate; (5) has no adverse effect on the effectiveness of any herbicide which might also be applied; (6) has been known to hasten maturity in tomatoes by two weeks or more.

Apparently the action of the phosphoric acid on the soil is that it prevents the very small minute soil particles from running together upon application of moisture such as rainfall or applied water.

This rig is applying a band of phosphoric acid on each bed.

Its use has become so popular that a total of 5,000 acres of beets may be planted thusly in 1969 which is definitely a step toward what we are all striving for, "planting to a stand".

Soils in the Josephine area of District III, Woodland are susceptible to crusting after rainfall. Since sugar beets are planted early in this area crusts are sometimes a problem.

This past year two materials phosphoric acid and nitric acid were evaluated as anti-crustants. The test was made in a May 15th planting which is later than normal for the Josephine area, but sprinklers were used to simulate natural rainfall.

The conditions under which the plot was established are as follows:

(1) A sandy clay loam soil worked real fine.

(2) On May 15th, two rows were sprayed with a 15% phosphoric acid water solution at a rate of 19 gal/acre at 6 MPH and two rows were sprayed with a 10% nitric acid and water solution at a rate of 19 gal/acre at 6 MPH and two rows were left untreated as a check.

(3) First sprinkling was done the 19th of May when enough water was applied to cause puddling.

Nine days after the first sprinkling the following results were observed:

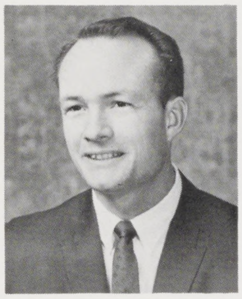
(1) Phosphoric acid at 19 gal/acre at 6 MPH gave a looser bed surface than did the nitric acid. In fact the nitric acid was not any better than the control in reducing the crust.

(2) Beet seedlings emerged directly through the soil surface in the phosphoric acid treated rows instead of cracks as was the case for the nitric acid treatment and the control.

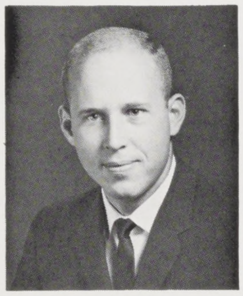
(Continued on page 48)

AGRICULTURAL STAFF CHANGES

Allen Dunlap


Gene Wilkinson

Roger McEuen


Bill Story

Michael Day

Allen Dunlap Joins Research Staff

☐ J. Allen Dunlap recently joined Spreckels Sugar Company's District V, Arizona Agricultural Research Staff as an Agronomist. He will fill the position in Chandler vacated by Jack Brickey who recently resigned to accept a position with a farming concern in the Phoenix area.

Mr. Dunlap was formerly employed as a Research Associate in Horticulture at the University of Arizona Citrus Experiment Station. He is a native of Fort Atkinson, Wisconsin. He attended the University of Wisconsin and majored in Horticulture. He recently completed his Masters Degree in Genetics at the University of Arizona. He is a member of the American Genetics Society, the American Society of Agronomy and the United States Naval Reserve.

Mr. Dunlap, his wife Kay, and two children reside in Mesa, Arizona.

Gene Wilkinson Now Agronomist

☐ Gene Wilkinson formerly Field Superintendent in District III, Woodland has been promoted to the position of Agronomist, District III. He has been serving in a dual capacity this past year handling research plots in conjunction with a field district. He will also serve as Agronomist for District II, Manteca.

Mr. Wilkinson joined Spreckels Sugar Company in January, 1960 as an Assistant Field Superintendent in the Bakersfield area. In July, 1960 he was promoted to Field Superintendent in the Arvin and Conner areas of the Bakersfield District. In July, 1962 he was transferred to District III, Woodland where he has served until the present. He hails from beautiful downtown Burbank where he attended local schools. He received a degree in Agronomy from Fresno State College.

Mr. Wilkinson, his wife Patti and two children, Katy and Kurt will maintain their residence in Woodland, California.

Roger McEuen to San Francisco

☐ Roger McEuen formerly Field Superintendent in District V, Arizona has been transferred to San Francisco where he will serve as Assistant to the Agricultural Manager.

He joined Spreckels Sugar Company in July, 1962, as an Assistant Field Superintendent in District II, Manteca. In December, 1962 he was promoted to the position of Field Superintendent in the Walnut Grove, Collegeville and Isleton areas. In November of 1965 he was transferred to Arizona in the same capacity where he served until the present.

He is a native of Hanford, California. He attended the University of California at Davis where he majored in Agronomy. He is a member of the Commonwealth Club of California.

Mr. McEuen, his wife Christina, and three children, David, Steven, and Susan will reside in the Bay area.

Bill Story Transferred to Arizona

☐ William H. Story, formerly Assistant Field Superintendent in District II, Manteca has been promoted to the position of Field Superintendent and transferred to District V, Arizona. He will handle the district vacated by Roger McEuen which encompasses a large area west of Phoenix.

Mr. Story joined Spreckels Sugar Company in 1968. He is a native of Greenville, California where he attended local schools. He is a graduate of the University of California at Davis where he majored in Agricultural Education.

Mr. Story and his wife Margaret now reside in Tempe, Arizona.

Michael Day Joins Mendota Staff

☐ Michael Day recently joined Spreckels Sugar Company's Agricultural Staff in District IV, Mendota as an Assistant Field Superintendent. He will work with the research and field staffs.

Mr. Day is a native of Layton, Utah. He attended Davis High School in Kaysville, Utah and received a Bachelor of Science Degree in Plant Science at Utah State University.

Mr. Day, his wife Kathy, and daughter Jennifer live in Fresno.

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FERTILIZER

(Continued from page 41)

4. Addition of straw, along with fertilizer nitrogen greatly reduced the uptake of fertilizer nitrogen by the succeeding crops.

5. The time required for cycling fertilizer nitrogen through the soil organic fraction and back into available form apparently involves a matter of years, or perhaps decades, rather than weeks or months.

6. Fine shredding and early incorporation of crop residues into a moist soil are key factors in handling residues to avoid interference with planting operations.

ANTI-CRUSTANTS

(Continued from page 46)

(3) The number of seedlings emerging through the phosphoric acid treated rows were about 1/3 greater in number and they were more uniformly spaced down the row as compared to the control and nitric acid treatment.

(4) There was no seedling damage from the use of these two acids.

Conclusions drawn from this experiment were:

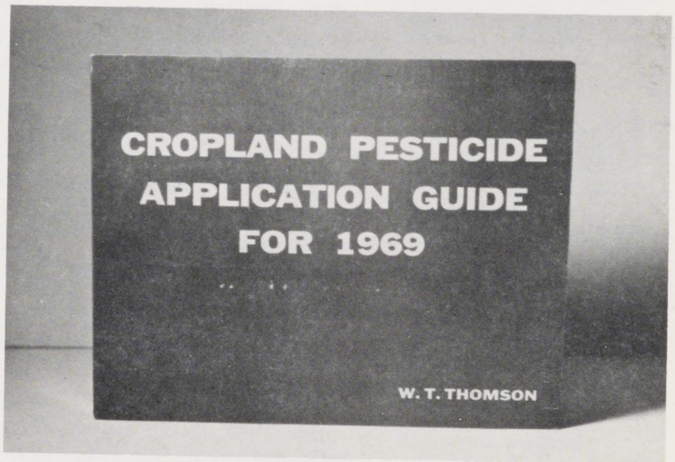
(1) The phosphoric acid treatment to the top of the beet rows can reduce crusting to the extent of improving beet seedling emergence and uniformity of stand as compared to non-treated rows in this experiment.

(2) The poor results obtained from the nitric acid treatment, which was no better than the control, was probably due to the leaching of the acid from the soil surface whereas phosphoric acid does not leach as readily.

New Pesticide Reference Texts

Thomson Publications of Davis, California is now offering two new field reference guides for pesticides. One text is "The 1969 Insecticide, Herbicide, Fungicide Quick Guide and Date Book". This text cross-references pesticides to registered usage and then the pests each individual material will control are listed in alphabetical order. A quick answer can be readily obtained to questions such as what can be used to control mites on corn or pigweed in cucumbers or powdery mildew on apples. This book is sold in a handy three ring binder and a date book section is included for appointments or keeping track of expense account information. Price $15.00. Revised yearly; approximately 200 pages.

The second text is "The 1969 Cropland Pesticide Application Guide". This book is up to date and will be revised on a yearly basis. Sold in heavy duty stable binding it is designed for use in both the field and the office. It is a handy reference to have in the ever expanding field of agricultural chemistry. Price $20.00. Approximately 600 pages. These books can be obtained from: Thomson Publications, P.O. Box 989, Davis, California 95616.



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SPRECKELS SUGAR BEET BULLETIN

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